DOCUMENT RESUME

ED 413 253 SO 026 882

AUTHOR	Gardner, Nancy C., Ed.; Thompson, Christine, Ed.
TITLE	Visual Arts Research, 1995.
INSTITUTION	Illinois Univ., Urbana. Office of Continuing Education and Public Services.
ISSN	ISSN-0736-0770
PUB DATE	1995-00-00
NOTE	173p.; Published twice a year. Double-numbered as volume 21, numbers 1 and 2 and also as issues 41 and 42, respectively.
AVAILABLE FROM	Visual Arts Research, 143 Art and Design Building, 408 Peabody Dr., Champaign, IL 61820.
PUB TYPE	Collected Works - Serials (022) -- Reports - Research (143)
JOURNAL CIT	Visual Arts Research; v21 n1-2 1995
EDRS PRICE	MF01/PC07 Plus Postage.
DESCRIPTORS	*Aesthetic Education; Art Criticism; *Art Education; Childrens Art; Cognitive Development; *Cognitive Processes; *Cross Cultural Studies; Educational Research; Elementary Secondary Education; Sculpture; *Teacher Attitudes; Visual Arts

ABSTRACT

This document consists of the two issues of the journal "Visual Arts Research" published in 1995. This journal focuses on the theory and practice of visual arts education from educational, historical, philosophical, and psychological perspectives. Number 1 of this volume includes the following contributions: (1) "Children's Sensitivity to Expression of Emotion in Drawings" (Andrew S. Winston; Brenda Kenyon; Janis Stewardson; Theresa Lepine); (2) "Second Grade Students Developing Art Historical Understanding" (Mary Erickson); (3) "The Importance of Conversations about Art with Young Children" (Marjorie Schiller); (4) "Sculpture: The Development of Three-Dimensional Representation in Clay" (Claire Golomb; Maureen McCormick); (5) "A Microethnographic Study of a Novice, Bicultural, Elementary Art Teacher: Context, Competencies, and Concerns" (Mary Stokrocki; Isabel White); (6) "A Cross-Cultural Assessment of the Maitland Graves Design Judgment Test Using U.S. and Nigerian Subjects" (Joseph Uduehi); (7) "When a Photograph is Judged Artistic: The Influence of Novelty and Affect" (Philip H. Marshall; Ashton G. Thornhill); (8) "Elementary Art Specialists' Comfort Level in Teaching in the Art Museum Setting" (Denise Lauzier Stone). Number 2 contains: (1) "Commonsense Aesthetics of Rural Children" (Norman H. Freeman; Daniella Sanger); (2) "A Cross-Cultural Assessment of the Maitland Graves Design Judgment Test Using U.S. and Nigerian Subjects" (Joseph Uduehi); (3) "Concurrent Viewing May Alter Verbal Reports about Artwork" (Lauren Sue Seifert); (4) "Color Adaptation for Color Deficient Learners" (Donald D. Johnson); (5) "Children's Representation Systems in Drawing Three-Dimensional Objects: A Review of Empirical Studies" (Eundeok Park; Bin I); (6) "An Examination of Untutored Thematic and Observational Drawings Made by Third- and Seventh-Grade Students" (Thomas M. Brewer); (7) "A Longitudinal Perspective of an Ethnography: The Life-World of a Beginning Teacher of Art Revisited" (David Hawke). (MM)

Spring 1995
Vol. 21, No. 1 (Issue 41)

VISUAL ARTS RESEARCH

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VISUAL ARTS RESEARCH

Formerly *Review of Research in Visual Arts Education*

Educational, Historical, Philosophical, and Psychological Perspectives

Spring 1995 Vol. 21, No. 1 (Issue 41)

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Published twice a year
by the University of Illinois

4

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Visual Arts Research

(ISSN 0736-0770), formerly *Review of Research in Visual Arts Education,* is published twice yearly (Fall and Spring) in cooperation with the Office of Continuing Education and Public Service and the School of Art and Design of the University of Illinois at Urbana-Champaign.

Subscriptions: Subscriptions are $16.00 for one year for individuals ($23.00 foreign); $27.00 for institutions ($34.00 foreign). Single issues are $10.50. Prepayment is required; make check or money order payable to University of Illinois, in U.S. dollars. Address orders to *Visual Arts Research*, 143 Art and Design Bldg., 408 Peabody Dr., Champaign, IL 61820. Send mailing label from most recent copy when requesting a change of address.

Manuscripts: Manuscripts with a 100-150-word abstract should be submitted to the Editors, *Visual Arts Research*, 143 Art and Design Bldg., 408 Peabody Dr., Champaign, IL 61820. Submissions should include an original and three copies and should follow policies and style outlined in the *Publication Manual* of the American Psychological Association, 3rd edition. Submissions will be accepted on computer disk when accompanied by an original hard copy. A Macintosh system is used by *VAR*, however other formats are acceptable. *Visual Arts Research* is listed in *Psychological Abstracts, Psyc INFO*, and *Psyc ALERT*.

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VISUAL ARTS RESEARCH

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Children's Sensitivity to Expression of Emotion in Drawings

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Abstract

Three studies of children's ability to create and detect expression of emotion in drawings are reported. In Study 1, children in grades one, four, and seven were asked to deliberately vary their drawings of a tree to show "happiness" and "sadness." Compared to younger children, older children used a greater number of strategies to express emotion, were more likely to use color and line direction, were more likely to use themes of death, aging, illness, and seasons of the year. In Study 2, children in grades two, four, and six made drawings as in Study 1, and were administered the Metaphoric Triads Test (Kogan, Conner, Gross, & Fava, 1980) of visual metaphor comprehension. With the effects of age partialled out, sensitivity to visual metaphor was related to the expressive use of themes of aging, illness, and death, and the use of the size or shape of the tree. In Study 3, preschool children viewed 12 specially constructed drawings in which emotion was expressed thematically (e.g., thunderstorm for anger) and 12 drawings in which emotion was expressed through abstract qualities of color or line. Children identified the emotion expressed in the drawings at above chance levels for all picutres except abstract, sad items. The conception of "expression" as a planned activity is discussed.

Children's Sensitivity to Expression of Emotion in Drawings

The notion of "expression of emotion" has a long history and a central role in discussions of the nature of art (e.g., Collingwood, 1938; Goodman, 1976; Tolstoy, 1930). Although there has always been debate about whether the emotion is located in the artist, the work, the audience, or all three, the basic notion that works of art communicate emotion of mood is widely shared. Despite the importance of expression in aesthetic theory, the study of children's art has focused on the development of representational skills (e.g., Freeman & Cox, 1985; Golomb, 1992), and relatively little is known about expression in children's art.

The drawings of young children certainly appear to express mood in their bold use of color and line. So prominent is this characteristic that the drawings from early childhood are often compared to those of modern masters, while drawings from middle childhood, when children strive toward realism, seem less appealing (see Winner, 1982). However, the nature of these abilities remains unclear. Are the expressive qualities of the drawings merely a happy accident, a byproduct of the young child's lack of concern for realism, or can young children *deliberately* alter the expressive qualities of their drawings? That is, can children *plan* expression in the way they can plan representation (see Freeman, 1977, 1980)? What strategies do children have for accomplishing emotional expression and how do these strategies change as children develop? What general cognitive skills might be related to expression in drawing? How early does sensitivity to expression in drawing appear?

Previous studies of the ability to pro-

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duce expression have generally indicated that such skills develop relatively late. In Carothers & Gardner (1979), children from six to eleven years old were given pairs of drawings that differed in mood (happy and sad) and were asked to add trees and flowers "just like the kid who drew this would have drawn." Only sixth graders were able to perform this task consistently. Ives (1984) asked participants aged 4 to 20 to create drawings that were happy vs. sad, angry vs. quiet, loud vs. hard. Adult judges determined the "correctness" of the expression and classified the children's strategies for expression into three general categories: "literal" (use of a sad or happy face), "abstract," (e.g., use of drooping lines for sadness), and "content" (e.g., broken branches on a tree). "Correct" expression rose with age, but accuracy did not reach levels over 80% until age 13. Children 5-7 were able to use literal expression, but less able than older children to use abstract expression, and surprisingly, showed almost no use of content expression until age 16. Such findings are difficult to reconcile with the apparent expressive richness of drawings from early childhood. It is possible that the expressive abilities of young children are somehow obscured by the task demands. Alternately, mature appreciation of expression may be a later stage of aesthetic development (see Parsons, 1987).

Investigations of the ability to *detect* visual expression of emotion have yielded a conflicting picture. For example, Gardner (1974) found that children as young as four could match the words "happy" and "sad" to appropriate colors. Blank, Massey, Gardner, and Winner (1984) reported that 5-year-olds could identify the "mood" of an abstract painting at above chance levels. In contrast, Winner, Rosenblatt, Windmueller, Davidson, and Gardner (1986) found that detection of expression in drawings appeared at age 9 or above.

One missing element in previous studies is an analysis of how children use "themes" for expression. Children do not inject unrelated elements of content in order to make a drawing happy or sad. Sky, grass, weather, or even a "happy face" on a tree are often part of an integrated theme or narrative (see Duncum, 1993). Younger and older children may differ substantially in their ability to organize various themes for the expression of an emotion. A related problem is that studies of aesthetic development generally have not provided children the opportunity to explain their preferences or their drawings (Parsons' 1987 work is a notable exception). Adults might readily misinterpret both what a child has drawn and the stylistic elements of the drawing. Interpretation of the variations within and between a child's drawings is therefore problematic without systematic interview data.

A third problem in previous research involves the strategies for expression that are available for the child. In the mature artist, expression of mood or emotion may be achieved through a highly complex interplay of color, light, line, relative sizes and volumes, use of space, and a host of other stylistic devices. It is surprising that studies cited above have not examined children's expressive use of color in their drawings, although we have ample evidence that children are sensitive to the expressive value of colors (e.g., Gardner, 1974; Lawler & Lawler, 1965), and use color as a salient dimension for classification (e.g., Harrison, 1990).

In the present research, we investigated children's emerging competencies for producing and detecting expression. In order to deal with the issues raised by earlier research, we asked children to make a specific pair of drawings—a tree that "showed happiness" and a tree that "showed sadness"—in which they could use a varied set of themes and abstract properties (including color) that could be reliably classified. In addition, the children were carefully interviewed regarding the strategies they used, and the interviews were used for interpretation of the children's strategies. In the three studies described below, every effort was made to elicit the child's maximum performance. The task was structured to reduce memory demands, eliminate distracting stiumulus dimensions, and provide instructions that all children could understand.

Study 1

The major goal of Study 1 was to explore developmental differences in the use of expressive strategies. Specifically, we examined whether older children, compared to younger children, would: (1) use a greater number of themes to convey "happiness" and "sadness," (2) show differences in the type of themes used, (3) show more frequent use of color, line direction, and size or shape, and (4) show more awareness of the expressive value of these abstract properties.

A second goal of Study 1 was to examine the way in which task variables might obscure the ability of young children to use abstract properties expressively. If a child is asked to make a drawing of a tree that "shows sadness," salient themes such as season of the year and weather provide a relatively easy solution to the problem of expressing sadness, and the child would have little reason to find other strategies for expression. We hypothesized that children would show increased use of color, line direction, and size or shape for expression if the task was altered to direct their attention away from the representational aspects of the drawings, by limiting the opportunity to use salient themes and by asking the child to use colors that are nonrepresentational but have emotional connotation.

Method

Subjects. One hundred and two boys and girls from grades 1, 4, and 7 (34 at each grade) served as subjects (mean age = 6.66, 9.66, and 12.5 years). The children were predominantly from white, middle class families, and attended public school in a small town in Ontario, Canada. Data from three children were discarded because of failure to follow instructions (2) or experimenter error (1). Both parental and child consent were obtained for all participants.

Procedures. The children were seen in individual, one-hour sessions held in a quiet room at their school. After a few minutes of casual conversation to establish rapport, the children were asked to make two drawings using a set of felt-tip colored pens: a drawing of a tree that "showed happiness" and a drawing of a tree that "showed sadness." The children were told that "it doesn't matter if it looks like a real tree or not. It is more important that your picture show happiness (or sadness) so that if someone else were to look at it, they would say it makes them think of happiness (or sadness).

Using probe questions, the adult insured that each child understood the instructions, and in particular understood that two separate drawings would be done in succession. Then the child was asked to begin the first drawing, with the order of emotion (i.e., happy or sad) counterbalanced. Children were permitted to look at their first drawing while they completed the second, in order to maximize the likelihood that children would deliberately alter the drawings. Each drawing was made on a sheet of 32 cm x 45 cm white art paper.

For half the children, the task was changed in a number of ways to maximize the likelihood that children would show expressive use of color and line direction and size. In the *Unrestricted Condition*, children were given 8 colors: green, black, brown, red, yellow, orange, blue, and purple. No limitations were placed on the content of the drawing. In the *Restricted Condition*, children were asked to use only four colors which were *not* representational for trees but which had been reliably judged as happy and sad colors by children of similar age in a pilot study (orange and yellow for happy, blue and purple for sad). Children in the Restricted Condition were asked to draw only a tree, with no leaves or flowers. These restrictions on content were designed to make color, line direction and size or shape more salient dimensions for the children.

For all children, the adult emphasized that "it doesn't matter if it looks like a real tree or not . . . it is more important that your picture show happiness or sadness so that if someone else were to look at it they might say that the picture makes them think of happiness . . . it is all up to you how you make it show happiness." All children were then asked, "What do I want you to draw?" as a probe of their comprehension of the instructions. Any questions about how to make the tree happy or sad were answered by saying, "it's all up to you." When the child began drawing, the adult turned to one side and read a book.

After the first drawing was completed, the children were asked to describe how they had made the drawing show happiness or sadness, and were asked to make up a title for the drawing. All children were given a general statement of praise (e.g., "I like your drawing") because children of this age are accustomed to being praised for their artistic efforts, and silence on the part of the adult might easily be mistaken for disapproval.

The first drawing was placed in the upper right hand corner of the desk, to allow the child to use the first drawing as a cue for possible alterations in the second drawing. Identical instructions were then given for the second drawing. The children were asked about and praised for the second darwing in the same manner as the first drawing. A maximum of 10 minutes was allowed for each drawing. Children who did not finish in 10 minutes were asked to "try to finish up now."

After completion of the drawings, a tape-recorded interview was conducted in which the child was asked to talk about the drawings, clarify ambiguous features, and describe how the drawings were made "happy" or "sad." The interview proceeded from general questions, such as "tell me how you made the drawing show happiness," to specific questions, such as "what is this black mark on the tree?" A number of steps were taken to minimize the demand characteristics of the interview. For example, to avoid prompting a child to say that a change in the colors from the happy to the sad drawing was for some reason, the adult would always say: "Did you try to make the two trees different or did it just come out that way?" In other words, the adult attempted to convey to the child that it was acceptable if there was a reason for something in the drawing and it was just as acceptable if there was no reason.

Scoring. The two drawings from each child were judged as a pair, that is, by examining variation across the drawings. The interview transcript was used to clarify such issues as: is it winter or is the tree dying? Using the coding scheme developed in pilot work with a different sample, each pair was scored for the presence or absence of each of six "themes" for happiness and sadness: (1) Personification[2] of the tree, sun, or clouds, (2) Seasons of the year/Seasonal vegetation, (3) Health/Death/Aging, (4) Weather conditions, (5) Attack or nurturance directed toward the tree, (6) Social activities in and around the tree. The themes are not mutually exclusive categories; a child's drawing could be scored as having none, one, several, or all of the themes.

Table 1 shows examples of the elements used to score each theme. Half of the drawings were also scored by a second rater. The percentage agreement between the two raters averaged 93.3% for the six themes (range 88%–100%).

Using the interview transcript as a guide for the interpretation of ambiguous elements in the drawings, the pair of draw-

Table 1. Brief Description of Themes Scored in Study 1 and Study 2

Personification

Happy drawing: "Happy Face" on tree, sun, clouds, or flowers.

Sad drawing: "Sad Face."

Season/Vegetation

Happy drawing: leaves, blossoms, or fruit on tree. Surrounding vegetation is appropriate to spring or summer.

Sad drawing: leaves falling from tree, or fallen on ground, or tree snow covered. Seasonal vegetation is dying or absent.

Aging/Illness/Death

Happy drawing: tree is young, healthy, growing.

Sad drawing: tree that is old, dying, sick, diseased, or dead. Note: interview must be used to distinguish between Season/Vegetation and Aging/Death.

Weather

Happy drawing: sun shining, blue sky.

Sad drawing: dark clouds, rain, lightning.

Attack

Happy drawing: tree is being nurtured.

Sad drawing: tree is damaged by humans or animals.

Sociability

Happy drawing: people playing around tree, animals living in the tree, multiple trees portrayed as "friends" (as indicated in interview).

Sad drawing: tree standing alone, animals, or people leaving.

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ings were reliably (*M* agreement = 90.3%) scored for use of color, line direction, and size to express the emotion. Children who varied these three properties in their drawings were asked during the interview to describe *why* they had made these changes. Their interview responses were reliably (*M* agreement = 90%) categorized as: (1) the child indicated that the colors or lines themselves were happy or sad, or (2) the child was unable to verbalize the expressive value of color, line direction, or size.

Results

Every child in the sample used at least one strategy for expression. A pair of sample drawings are shown in Figure 1. Given that the drawings were classified according to the presence or absence of each strategy, the resulting categorical data were analyzed using a log-linear analysis program, yielding Wald X^2's. The use of log-linear analysis permits specific comparisons of the cells in multi-way contingency tables. Number of themes used and number of expressive properties used (i.e., color, line direction, size) were analyzed in separate ANOVAs. The task variable (i.e., unrestricted vs. restricted condition) was of interest primarily in terms of its effect on the use of color, line direction, and size.

Number of Themes Used. Number of themes used in the pair of drawings was analyzed in separate, one-way (Grade) ANOVAs for the unrestricted and restricted conditions. A combined ANOVA for the two conditions would be inappropriate, due to the limitations on themes built into the restricted condition. Older children used significantly more themes in their drawings than younger children, but only in the unrestricted condition ($F(2,48) = 5.02$, $p < .01$).

Developmental Changes in Themes. "Personification," "Health/Death/Aging," and "Attack," were analyzed in separate log-linear analyses for the unrestricted and restricted conditions. These three themes were used by children in both tasks. The remaining themes of "Season/Vegetation," "Weather," and "Sociability," were analyzed only for children in the unrestricted condition, because the instructions precluded use of these themes in the restricted condition.

The themes used by the children in the unrestricted condition are shown in Figure 2. Grade 7 children were significantly less likely than grade 1 children to use "Personification," that is, a happy or sad face (Wald X^2 (1, $N = 34$) = 5.54, $p < .05$). The use of "Seasons of the Year" increased significantly across grade level (Wald X^2 (2, $N = 51$) = 8.80, $p < .05$), as did the use of "Aging/Death/Illness" themes (Wald X^2 (2, $N = 51$) = 12.17,

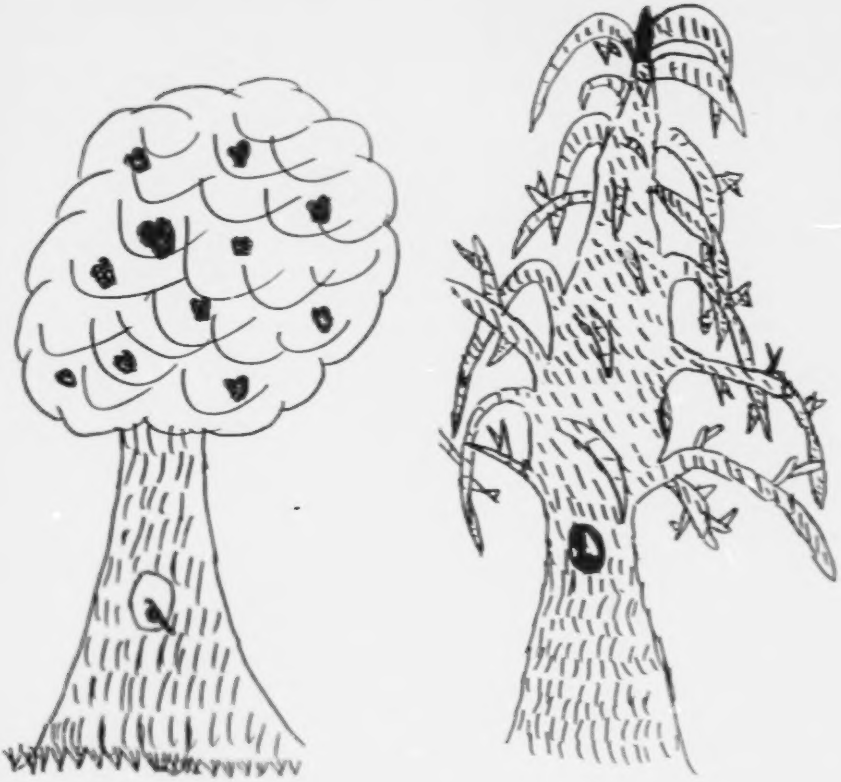

Figure 1. *Sample drawings, age 11.*

$p < .01$. For these themes, the significant difference occurred between grades 1 and 4. "Weather," "Attack," and "Sociability" were used by a substantial number of children at each grade, but the use of these themes did not increase with age.

For children in the restricted condition, the only age-related change was a significant increase in themes involving "Aging/Death/Illness" (Wald X^2 (2, $N = 51$) = 8.06, $p < .05$). As in the unrestricted condition, the significant difference occurred between grades 1 and 4.

Analyses of Color, Line Direction, and Size or Shape. Are older children more likely to use color, line direction, and size or shape expressively? When the children were scored as using none, one, two, or all three properties, a 3 x 2 (Grade x Condition) ANOVA revealed that older children used significantly more of these three properties than younger children, regardless of task condition ($F(2,96) = 10.52$, $p < .001$). When the children were categorized as having used or not used each property, the subsequent log-linear analyses revealed that in the unrestricted condition, 7th graders were more likely than 1st graders to use color expressively (Wald X^2 (2, $N = 51$) = 4.29, $p < .05$). However, when restricted to only four, non-representational colors, expressive use of color by 1st graders rose to the level of the 7th graders.

Overall, there was a significant in-

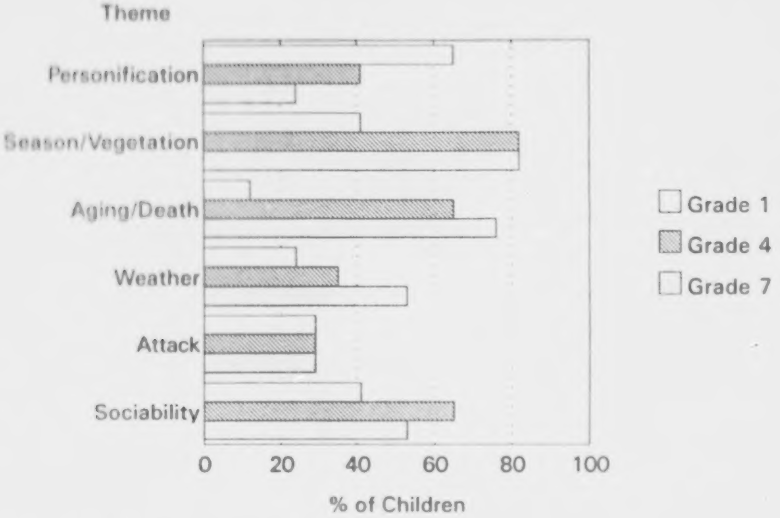

Figure 2. Unrestricted use of themes in study 1.

crease in the expressive use of line direction across grade (Wald X^2 (2, N = 102) = 10.57, $p < .01$). When the drawing was restricted to a tree alone, with no leaves or flowers, expressive use of line direction showed a marginally significant increase for grade 1 (Wald X^2 (1, N = 34) = 3.39, $p < .06$), no significant change for grade 4, and a significant increase for grade 7 (Wald X^2 (1, N = 34) = 4.29, $p < .05$). The expressive use of the size or shape of the tree increased across grade in both the restricted and unrestricted conditions (Wald X^2 (2, 102) = 9.49, $p < .01$).

The interview data revealed that among first graders who used colors expressively, 62% were unable to verbalize about the expressive properties of the colors they had used; older children were much more likely to have this ability (Wald X^2 (1, N = 68) = 5.67, $p < .05$). However, when the task was restricted to nonrepresentational colors, then all children at all three grades reported that at least one reason for their color choices was that the colors were themselves happy or sad.

Discussion

All children, including all 1st graders, were able to use at least one strategy for creating drawings that conveyed "happiness" and "sadness." Older children had a larger repertoire of expressive skills than younger children, both in the number of themes and the number of stylistic properties (i.e., color, line direction, size or shape) used.

The success of the 1st graders in the present study may seem inconsistent with Winner, Rosenblatt, Windmueller, Davidson, and Gardner's (1986) finding that 7-year-olds did not reliably notice aesthetic properties in works of art. However, as suggested by Winner et al. (1986), there may be disparity in the development of perception and production of art. That is, children may be more sensitive to expression in their own drawings than in tasks where they are shown artworks created by others. Alternately, the task may have posed memory or other cognitive demands that obscured the abilities of younger children.

Developmental changes in the use of

particular themes may reflect growing metaphorical competence as outlined by Kogan, Conner, Gross, & Fava, 1980. Themes of "Health/Death/Aging" and "Seasons of the Year" may require greater sophistication regarding visual metaphors for emotion than a theme such as "Sociability," in which children are depicted playing happily around the tree and thereby literally depict happiness. In addition, the increased use of "Health/Death/Aging" and "Seasons of the Year" may be related to children's developing concepts of life, decay, and death, and their understanding of the interconnectedness of these themes.

The decline among older children in the use of Personification is consistent with Ives (1984) finding of a decline in "literal" expression. One possible reason for this decline is that as children enter the "age of realism" (see Gardner, 1980), they may increasingly sense that a face on a tree is not "correct" because it is not realistic. Whether the use of personification is associated with animistic thinking about the world is an additional possibility that should be explored with careful interviews.

The proportion of children using color, line direction, and size or shape for expression of emotion increased with age. However, the results of the task manipulation suggest caution in interpreting these effects. With nonrepresentational colors, 1st graders used color expressively at a level not significantly below 7th graders. Restricting the choices seemed to focus the attention of younger children on expressive as opposed to representational value of the colors. The interview data provide suggestive evidence of this possibility: with nonrepresentational colors, significantly more of the 1st graders identified the expressive value (i.e., "blue is sad") as the reason for their color choices. Expressive use of line direction increased for 1st and 7th graders when they were asked to draw only a bare tree with no leaves or fruit. These content restrictions may have changed the salience of line direction by requiring children to focus on how they would represent the bare branches of the tree. In sum, representational colors and content may serve as distracters that inhibit sensitivity to and use of stylistic strategies for expression (see Gardner, 1970, Cupchik, Winston, & Herz, 1992). In the Unrestricted Task, the children seemed highly focused on the thematic content of their drawings, and alterations to color and line were primarily in the service of a theme or narrative.

Study 2

In order to understand the developmental changes described in Study 1, it is necessary to explore the cognitive underpinnings of these changes. As indicated above, competence in visual metaphor may underlie some of the changes in children's ability to convey emotion in a drawing. Children with greater ability to identify themes and visual structures that are metaphorically related to emotion would presumably be better able to generate a variety of pictorial means for conveying emotion. In Study 2, we used the measure of visual metaphor sensitivity developed by Kogan et al. (1980) to investigate whether metaphoric competence would predict use of thematic or abstract strategies for expression of emotion in the drawing task. Given that this skill increases with age, an important question is whether visual metaphor sensitivity will predict expression in drawing if the effects of age are removed.

Method

Subjects. Sixty boys and girls from grades 2, 4, and 6 (20 at each grade) served as subjects (Mean age = 7.9, 9.9, and 11.9 years). The children were predominantly from white, middle class families and attended a public school in a small town in Ontario, Canada. Both parental and child consent were obtained for all participants.

Materials. The "tree" drawings were made using materials described in Study 1. The Metaphoric Triads Task (MTT) consists of 29 sets of 3 pictures. The original colored sketches were separately photographed to produce 87 color plates of 12.6 cm x 8.7 cm. For ease of handling, each picture was mounted on a piece of white cardboard, 12.8 x 20.5 cm.

Procedures. All children were seen individually. Sessions lasted approximately one hour and were conducted in a room at the child's school. The child and the adult sat facing each other at a large desk. The drawing task, using the procedures in Study 1, was administered first, followed by the MTT, for all children. This constant order was used, rather than counterbalanced order, to avoid any possibility that the MTT pictures would influence the children's drawings.

After two to three minutes casual conversation, each child was asked to produce two drawings. Order of the drawings (i.e., happy vs. sad) was counterbalanced across grade and sex. The adult then engaged the child in two minutes of casual conversation before beginning the MTT.

The adult introduced the MTT by explaining that she was interested in what children thought about different pictures, and how different pictures might go together. The MTT was then administered according to the modified procedures outlines by Kogan, et al. (1980). Each group of three pictures, or "triad," was presented one at a time, arranged as two pictures on top, and one below. One of the two pictures on top was related to the bottom picture *literally*, and the other picture on top was related to the bottom picutre *metaphorically*. For example, one triad consists of lightning and thunder clouds in the bottom picture, and a man walking in the rain (literal choice) for one picture on top, and an angry man shaking his fist (metaphoric choice) in the other picture. The picture metaphorically related to the bottom picture was placed either on the right or the left according to a predetermined, randomized order. The adult pointed to the bottom picture in each group and asked the child to pick which of the two pictures on top would make a good pair with the bottom one, "because they are alike or go together." The children were asked to explain why they thought the two pictures made a pair, whether or not the other picture could also make a pair, and why. The answers to these questions were recorded manually and verbatim by the adult.

Scoring. The drawings were scored by a psychologist who was unaware of the grade, sex, and MTT score of the child. The pair of drawings were categorized for the use of six content themes and three stylistic properties to express the emotions of happiness and sadness. The MTT was scored using the system described by Kogan et al. (1980), with each item assigned a score from zero to two. The scoring uses both the pairing given by the child and the reason given for the pairing. A second rater, blind to the MTT score, grade, and sex of the child, independently scored the MTT protocols for all children. The resulting Pearson *r* between the two raters was .99.

Results and Discussion

Given that the data consisted of a set of interrelated variables (i.e., MTT score, grade, sex, themes, and stylistic properties used in the drawings), the data set was first subjected to the canonical correlation analysis using least squares (CANALS) developed by van der Burg (1983). This analysis allows canonical correlation with categorical data, and generates scale values that can then be used for calculation of correlations. This program allows for maximization of relationships between the variables without unknown inflation of type II error by repeated tests on the data set.

Table 2. Pearson Correlation Coefficients, Study 2

	MTT	Grade	Sex	MTT (Grade partialled out)
Personification	–.27*	–.28*	–.27*	–.15
Season/Vegetation	.12	.25*	.10	–.03
Aging/Death	.39**	.13	–.08	.39**
Weather	.02	.30**	–.07	–.07
Attack	.01	.27*	–.39**	–.19
Sociability	.05	.19	.14	–.08
Color	.24*	.22*	–.11	.15
Line Direction	.21	.12	–.10	.17
Size/Shape	.39**	.28*	–.20	.29*

*$p < .05$. **$p < .01$.

As expected, grade and MTT scores were highly correlated ($r = .57, p < .001$). Without controlling for the effects of grade, MTT scores were negatively related to use of personification ($r = -.27, p < .05$), positively related to the use of aging, illness, and death ($r = .39, p < .01$), color ($r = .24, p < .05$), and the size and shape of the tree ($r = .29, p < .05$). With grade controlled by partial correlation, MTT scores were positively related to the use of aging, illness, and death ($r = .39, p < .01$), and to expressive alterations in the size and shape of the tree ($r = .29, p < .05$). In other words, greater skill at detecting visual metaphors was related to greater use of both selected thematic and abstract strategies for expression of emotion in the drawings.

Although these correlations are modest, the independence of this effect from grade level makes it likely that metaphoric skill plays some role in the development of expressive abilities. Moreover, Kogan et al. (1980) found that scores on the MTT were *not* related to verbal intelligence on standardized tests or teacher ratings of intellectual aptitude, so the relationship between expressive skill and MTT cannot be accounted for by intelligence as a third variable. Kogan et al. (1980) did find that in some age groups, MTT scores were related to divergent thinking, originality, and aesthetic sensitivity. The relationship between sensitivity to expression of emotion in art and this complex of aesthetic skills certainly warrants further study.

Study 3

If children in grade 1 can reliably alter their own drawings to communicate emotion, then it is important to know how early the ability to *detect* emotion in a drawing develops. Although it has been suggested that it may be more difficult for children to detect expression of emotion in the work of others than to produce it in their own work (Winner et al., 1986), it is unlikely that skill at reception would precede skill at production. A major difficulty in this area is that studies have used a variety of tasks, including recognition, labelling, and match-to-sample. These tasks, designed primarily for older children and adults, present attention and memory demands which might exceed the capacity of young children. In addition, the use of famous paintings, such as a Picasso, might introduce elements that are distracting to young children and thereby interfere with their performance. In Study 3, we examined whether preschool children could successfully identify the emotions of happy, sad, and angry in specially constructed drawings under conditions to maximize their performance. In addition, we wished to know whether sensitivity to thematic expression would be stronger than sensitivity to expression through abstract properties.

Method

Subjects. Fifty-five children, 24 boys and 31 girls, between the ages of 3 years 10 months and 5 years 6 months (mean age = 4 years, 9 months) participated. Children were primarily from white, middle-class families and attended daycare or preschool in Southern Ontario. Both parental and child consent were obtained for all participants.

Sensitivity Task Development. The stimuli for the sensitivity task consisted of 24 specially constructed drawings, 16.5 x 11.5 cm., depicitng three emotions: happy, angry, and sad. Half the drawings depicted emotion thematically using four different themes: changes in weather, social behavior in birds (see Figure 3), health of a tree, and domestic order in a kitchen scene. The remaining drawings depicted emotion abstractly. The three properties scored in Study 1 and Study 2, color, line direction, and size/shape of forms, were incorporated into this task. Based on work by Carothers and Gardner (1979) and others, a fourth abstract dimension, line quality, was also included. Thus, there were four examples for each of the three emotions in both thematic and abstract form.

Every effort was made in the construction and pretesting of these stimuli to ensure that images in the thematic drawings were comprehensible to preschool children and that the differences in abstract drawings were salient. A sample of adult raters agreed with the designated emotion 98.3% of the trials for thematic representation, and 92.5% of the trials for abstract stimuli.

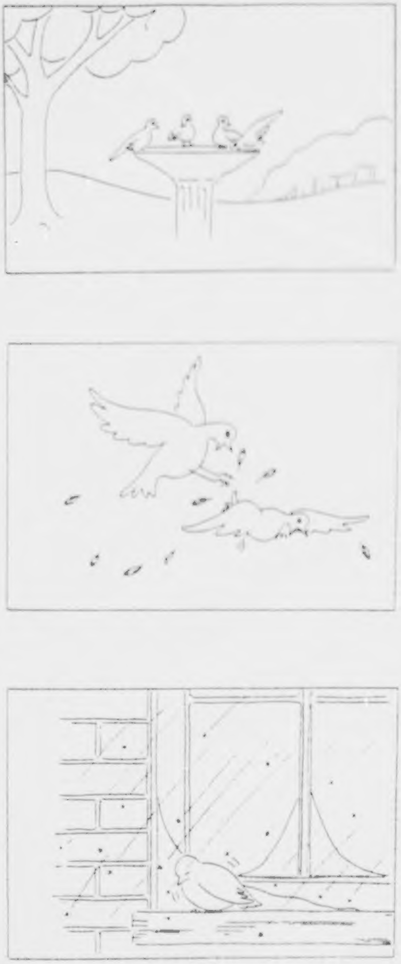

Figure 3. *Sensitivity task example.*

Procedure. Children were tested individually in a quiet corner of their preschool or daycare. After three warm-up trials with neutral stimuli, each of the 24 pictures was presented. For each presentation the child was asked to decide if the picture was a happy, angry, or sad picture. To facilitate maximal performance and to minimize task demands, children were permitted to examine the pictures as long as they wished. They could respond by pointing to pictures of happy, angry, or sad faces, by making faces themselves, or by labelling the emotion. Pictures were presented in a fixed, randomized order and half the children saw the sequence in reverse order.

Results and Discussion

The percent of children responding correctly to each picture is presented in Table 3. For each of the combinations of emotion (happy, sad, and angry) by format (thematic and abstract) there were four pictures. The average number correct out of four was computed and tested against chance level of responding via t-tests. The children identified the emotion correctly at above chance levels for all but the abstract sad pictures. A comparison of the 12 youngest children (*M* age = 50 months) and 12 oldest children (*M* age = 64 months) in the sample indicated that they did not differ in accuracy.

A 2 (Format) x 3 (Emotion) repeated measures ANOVA on the number of correct responses yielded significant main effects for format ($F\ (2,108) = 20.93$, $p < .001$) and for emotion ($F\ (2,108) = 20.93$, $p < .001$), and a significant interaction between format and emotion ($F\ (2,108) = 18.59$, $p < .001$). Tukey HSD comparisons indicated that correct identification was higher for happy vs. sad pictures and higher for thematic vs. abstract pictures. Abstract sad items were significantly more difficult than all others.

Table 3. Percent of Children Responding Correctly by Format and Emotion, Study 3

	Emotion Expressed by:			
	Theme		Abstract Properties	
HAPPY	Weather	100%	Color	91%
	Birds	98%	Line Dir.	64%
	Kitchen	98%	Line Qual.	53%
	Trees	89%	Shape	56%
ANGRY	Weather	44%	Color	78%
	Birds	58%	Line Dir.	42%
	Kitchen	71%	Line Qual.	44%
	Trees	76%	Shape	69%
SAD	Weather	91%	Color	36%
	Birds	95%	Line Dir.	36%
	Kitchen	64%	Line Qual.	31%
	Trees	82%	Shape	46%

When task demands are minimized and age-appropriate stimuli used, four- and five-year-old children can detect the expression of emotion in visual stimuli. Preschool aged children can detect both thematic and abstract forms of expression, although the latter are more difficult. Studies which suggested that these abilities develop later in childhood may have used stimuli or procedures that did not allow preschool children to show maximal performance. Given these findings, it is unlikely that children's ability to sense expression of emotion in visual stimuli develops *after* their ability to detect or create these features of their own artworks. With appropriate tasks, it may be possible to show that a rudimentary sensitivity to artistic expression of emotion is present in even younger children.

General Discussion

The results of these studies suggest that young children have considerable skills for detecting and conveying emotion in a drawing. They are able to examine their own work and systematically plan alterations in thematic material and abstract properties of the drawing. As children develop, their artistic repertoire for expression of emotion expands in terms of the range of themes and formal properties. For some aspects of the repertoire, recognition of visual metaphor is related to successful production of expression.

If, compared to younger children, older children have more skills for creating an expressive drawing, why do we typically think of younger children's drawings as more expressive? The answer, as suggested by Gardner (1980) and Winner (1982), is that what we experience as "expression" in younger children's drawings, may be unintentionally produced. In addition, the effect can also be understood as a "lack of constraint." That is, compared to older children, younger children are less worried about "getting it right" and more concerned with following their own agenda, such as putting in their favorite colors. This emphasis on "favoritism" is a fundamental characteristic of the first stage of aesthetic development in Parsons' (1987) stage theory. The effects of following their preferences are charming, but should not be confused with the ability to *deliberately* alter a drawing in order to convey an emotion or mood. Thus, there is no inconsistency in saying that younger children often produce drawings that are more pleasing, but older children are more skilled at expression of an emotion.

Although the children in these studies showed, on average, considerably more skill than expected, the *lack* of skill shown by many children should not be neglected. Even at grade 6 or 7, a number of children have a very limited repertoire for deliberately expressing happiness or sadness in a drawing. We have found this limited repertoire even when there are no suggestions for or restrictions on the content. Such children may have difficulty in sensing and valuing expression in their own art and art in general. Given that these skills may be bound up with sensitivity to visual metaphor, these children may not appreciate the fundamental role of metaphor in art (see Anderson, 1989). In later childhood and adolescence, as they develop greater concern for realism, it is well known that children become critical of their own work for failure to "measure up" to realistic standards of depiction. If they also fail to appreciate the expressive quality of their work and the expressive potential of artistic media, then the disinterest in art and the abandonment of drawing that often ensues is hardly surprising. Thus, there may be value in strengthening the place of expression of emotion and expression in general in art education.

To proponents of Discipline Based Art Education, this suggestion may appear to be a call for return to a Lowenfeldian, self-expression paradigm (see Manley-Delacruz, 1990; Wieder, 1990). But the use of the term "self-expression" in that tradition is obviously a different meaning of "expression" than the planned, skill-based communication discussed here. If "expression" is conceptualized as a repertoire of skills, and is examined within the context of studio, history, criticism, and aesthetics, then there is no conflict between the goals of DBAE and the systematic development of sensitivity to expression. It should be noted that the kind of expression studied here rests heavily on shared social conventions (e.g., a rising line for happiness) rather than on a unique artistic vocabulary. Our position is that planned, deliberate expression for communication and the spontaneous expression of inner feelings through unique artistic forms are both legitimate and valuable aesthetic processes.

Notes

1. If expression is viewed as necessarily "unplanned," then the child's ability to describe the deliberate changes in a drawing would not be relevant. The position taken here is that expression may be either deliberate or accidental in the art of both children and adults.

2. "Personification," usually evidenced by a "happy face," was scored as a theme rather than as a separate strategy for expression, as in Ives (1984) notion of "literal" expression. In an earlier study, children sometimes used the happy face in conjunction with other details indicating "personification," such as drawing the branches as arms and the roots as feet. During interviews the children often indicated that the "person-tree" was happy or sad about other events taking place in the drawing. Thus, the use of a "happy face" may indicate a more complex thematic strategy rather than a simple "literal" portrayal of happiness or sadness.

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Second Grade Students' Developing Art Historical Understanding

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Abstract

This paper reports on two different analyses of data from a study of second grade students' attempts at art historical interpretation. The first qualitative analysis focuses on two issues: (1) Can primary children understand an artwork in the context of the historical culture within which it was made? and (2) What comparisons can primary children make between the present and the past to help them understand artworks from other times and cultures? Part two analyzes second grade students' attempts at art historical interpretation using Parsons' (1987) account of the development of aesthetic experience. These analyses call into question the traditional assumption that primary children are not developmentally capable of historical understanding. They also suggest that historical understanding may not be typical of primary children, but may rather be the result of carefully planned instruction.

Is art history instruction appropriate content for primary school art education? Many art educators think not (Clark, Day, & Greer, 1987; Kleinbauer, 1987; Smith, 1989). Tradition tends to support the assumption that primary children are not developmentally ready to understand historical concepts. Some researchers have questioned this traditional assumption (Egan, 1989; Levstik, 1988; Kennedy, 1983). Specifically, in an effort to provide grounding for conclusions about the developmental appropriateness of teaching art history at the primary level, this study takes a qualitative look at second graders' attempts at art historical interpretation.[1]

An Analysis of Attempts at Art Historical Interpretation

Students, Program, and Data Collection

The second grade students in this study attended a suburban school serving lower to middle economic level households within a dominantly Euro-American community. The number of students with learning disabilities in the intact class selected for this study was higher than the average in the school. The participating teacher and this researcher planned the entire year's art program around ten roughly chronological, cross-cultural themes (Addiss & Erickson, 1993, pp. 185–187), using reproductions (some black and white and some in color[2]) of 100 artworks from various eras and cultures. The artworks used in the study included representational and non-representational two-dimensional and three-dimensional artwork, as well as many architectural and craft works. Throughout the school year students heard teacher presentations, took part in class discussions, and worked on related studio art projects.

Over a period of several weeks, each student studied one artwork using two packets of inquiry-oriented worksheets comprised of short answer and multiple-choice questions. The first packet focused on reproduction, restoration, basic facts, and description of an artwork (selected by the student from the reproductions). The second packet focuses on placing the selected artwork in its artworld context, natural context, functional context, and cultural context. After all this inquiry, students responded to four questions: (1) Historical Artist Question (Why do you think the artist made the artwork look the way it does?); (2) Historical Viewer Question (Why do you think the viewer back then wanted to look at the artwork?); (3) Historical Culture Question (What does the artwork tell you about what people generally thought or believed back then?) and (4) Historical Con-

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ditioning of Perception Question (How do you see this artwork differently from the people back then?).[3] Each student studied four different artworks in this manner during the course of the school year. Some students wrote their own responses. The participating art teacher transcribed some responses as dictated by individual students.

Qualitative analysis of responses to these four art historical interpretation questions focused on two issues: (1) Can primary children understand an artwork in the context of the historical culture within which it was made? and (2) What comparisons between the present and the past can primary children use to help them understand artworks from other times and cultures?

Historical/Cultural Understanding

Can primary children understand artworks in the context of the historical culture within which they were made? Many second grade students' responses to the historical artist question indicated that they were able to consider artworks from the perspective of a historical artist. Here are some of those responses: About a Cree basket, students wrote that the artist wanted "to make it special and to hold food," and "she needed to carry food"; about a prehistoric painting, "he tried to make an animal for magic"; about an Egyptian sculpture, "to worship his king"; about a medieval manuscript page, "to tell about God"; about an Islamic tile decoration, "it was a design and they could not add on people in their work"; about Boucher's *Madame Pompadour,* "to show the king's friend and make her pretty"; about Raphael's *School of Athens,* "he studied Greeks and Romans—they were his favorite people"; and about the U.S. Capitol, "they wanted it special like the Greeks."

Other responses were less clearly from a *historical* artist's point of view, such as: about a Byzantine mosaic students wrote "so it would be famous," "he wanted people to remember them," and "it was neat to look at"; about Chartres, "to look beautiful"; about a Chinese painting of ladies tuning a lute and drinking tea, "they thought it up to show people"; about a Meso-American temple, "so people can look at it," and "he wanted to carve stone"; and about an African mask, "to look nice—to look like a face." A few students do not seem to have considered an artist's point of view at all. Students wrote about a Byzantine mosaic, "it looks nice"; and about a prehistoric carving, "it's one of a kind." Almost all of the second grade students were able to consider artworks from an artist's perspective and many specifically from a *historical* artists' perspective.

A number of second grade students' responses to the historical viewer question indicate an ability to consider the historical viewer's perspective. Here are some of those responses: about an Islamic tile decoration, a student wrote that a viewer back then wanted to look at the artwork "to be reminded of Mohammed"; about Chartres, another student proposed that the viewer wanted "to learn more about Jesus and God"; about the Parthenon, "they went to talk to the gods"; about an aborigine painting, "they thought about magic and believed it"; about a Olmec sculpture, "wanted to remember the man"; about Boucher's *Madame Pompadour,* "it's beautiful—they knew her—she was their friend"; about the ruins at Mesa Verde, "he didn't [want to look at it], he just wanted to live there"; and about Van Gogh's *Starry Night,* a response indicating knowledge of Van Gogh's lack of success in the artworld of his time, "they [viewers back then] didn't get to look at it."

Other second graders responded from a viewer's perspective without reference to the *historical* context, for example: about a Kandinsky painting, a student responded "it's interesting"; about a carved Buddhist stone gate, "it's pretty and they wanted to see it"; about an

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Islamic tile decoration, "they liked it," and "it was a good design"; and about a Greek sculpture, "to see a stone archer." Virtually all second graders were able to consider artworks from a viewer's perspective and quite a few considered the work specifically from a *historical* viewer's perspective.

Very few second grade students' responses to the historical culture question indicated an ability to consider artworks from the perspective of the historical culture in general.[4] Here are a few that might indicate a rudimentary understanding of culture. About a medieval manuscript page, a student proposed "they thought about religion and about God"; about an Islamic tile decoration, "they thought and believed about God"; about Michelangelo's *Pieta*, "they were religious and liked art about God"; about an aborigine painting, "they thought about magic and believed it"; and about a prehistoric painting, "they thought about animals and hunting."

Most responses to the historical culture question made no specific reference to culture, historical and otherwise. Here are a couple of examples. About Bernini's *Ecstasy of St. Theresa*, a student responded "they liked pretty things"; and about Boucher's *Madame Pompadour*, "they liked to be rich and have flowers and dressers." By far the *cultural* factor most commonly referred to by second grade students was religion.[5] Although many second graders were able to consider artworks from a historical artist's and some from a historical viewer's perspective, the great majority of second grade students in this study were unable to consider the thoughts and beliefs of people in general in the historical culture when the artwork was produced.

The larger investigation of which the present study is a part provided quantitative evidence of developmental differences between second and sixth grade students' art historical interpretation abilities (Erickson, in press). Responses by both second and sixth grade students indicated the same sequence of increasing difficulty in interpreting from a historical artist's perspective, to a historical viewer's perspective, to a historical culture perspective. Both groups were able to interpret artworks from a historical artist's perspective the most consistently, from a historical viewer's perspective the next most consistently, and from the historical culture perspective the least consistently. Even though the sequence of difficulty was the same for second and sixth graders, not surprisingly, the sixth graders' responses (cumulative averages over four assessments) evidenced more historical understanding from all three perspectives (artist, viewer, and culture) than the second graders' responses.

Cross-Temporal Comparisons

What comparisons between the present and the past can primary children use to help them understand artworks from other times and cultures? Many second grade students in this study were able to recognize a difference between artworks of the past and similar artworks or artifacts with which they are familiar today. Writing about the ruins of an ancient Indian city, a student commented "it looks different, not like our city." Comparing an ancient Chinese bronze to contemporary vessels, another student observed "their buckets are different than ours." Comparing a Buddhist stupa gate to more familiar entrances, a second grader wrote "our doors are inside." Other students wrote that "our books are different [from the *Book of Kells*]" and "it's much different than the pictures in our books." Another student considering today's animal pictures in relation to prehistoric cave paintings, states that "we have *books* about animals."

At a somewhat more sophisticated level, several second grade students compared historical technology and present-day technology. Reflecting on an African mask, one student noted that "we don't make masks any more of wood, but we do out of plastic." Another student compared familiar art materials today with prehistoric materials when she noted that "they didn't have paper." About the Mission Church at Acoma, a student noted that "it's not like my church—it's mud." Writing about Mesa Verde, another student wrote "they didn't have the tools we have now."

Other students focused on differences between the everyday life of another time and their own lives today. for example, considering a prehistoric painting of animals, one second grade student noted "They needed food and clothes. We go to the store." A number of students were able to use their comparison of the life of another time in developing their own interpretations of artworks produced in that era. Discussing a prehistoric painting one second grader noted "they hunted for food—I never hunted for food" and connected this information to his interpretation by explaining that the historical artist wanted "to show how they hunted." Another second grader integrated his understanding of the difference between today's food gathering and historical Cree food gathering methods as he interpreted a Cree basket. He wrote that the Cree basket maker "thought about animals—she needed to hold stuff" and she wanted "to make it special and to hold food." He went further to reflect on how his own perception of the basket was affected by the difference between his life and the Cree basket maker's. He wrote in response to the historical conditioning of perception question "We see it different than her—we buy food from a store."

A number of second graders' responses indicated some awareness of differences in their own perception and that of persons of other times.[6] Writing about an Olmec sculpture of a ruler, a second grader wrote "they wanted to remember the man—I think it's strange." Showing a similar rudimentary understanding of different present and historical perceptions, another student wrote that prehistoric painters "wanted to tell a story—it looks weird to me." At a more sophisticated level a second grader explained how his perception of an aborigine painting was different from that of an aborigine by noting "they thought about magic and believed it—it looks [to me] like a pattern on the ground (dart board) not magic." Writing about viewer(s) of a Byzantine mosaic of the Empress Theodora, two students wrote that "he thought about the church—I see the queen only" and "they believed she was special—we don't know her." Another student wrote about Chartres that "we see it as a big church that is art" while she writes that medieval viewers "thought about spirits and God—they believed in God." Clearly evidencing an awareness of differing perceptions, a second grader wrote about an Islamic tile decoration that "they thought and believed about God" and "I see only shapes."

A substantial number of second grade students' attempts at art historical interpretation evidenced an ability to make one of two kinds of cross-temporal comparisons: (1) an ability to make comparisons between historical artworks and similar present-day artifacts, or (2) an ability to use various cross-temporal comparisons in expressing their awareness of differences between their own perceptions and the perceptions of viewers of other times and cultures.

An Analysis of Aesthetic Development

Aesthetic Development Theory

What implications do primary children's art historical interpretations have for aesthetic development theory? Parsons' (1987) aesthetic development theory describes five stages of aesthetic understanding. Increased attention to the social formation of cognition (Bruner & Haste, 1987; Wertsch, 1985) and gender influence on moral development (Gilligan, 1982) raise questions about Parsons' Piagetian cognitive foundations and

Kohlbergian assumptions about moral development. In addition DiBlasio's (1988) critique of Parsons' theory brings attention to the need to examine the role of structured art education on aesthetic development. The following analysis considers second grade students' art historical interpretations in order to shed light on Parsons' five stages of aesthetic understanding, in some cases confirming his observations and in others, raising questions for further study.

Stage One

Parsons identifies the primary characteristics of stage one as "an intuitive delight in most paintings, a strong attraction to color, and a freewheeling associative response to subject matter" (1987, p. 21). In the study reported here, even though not asked to do so, many second graders expressed their liking for artworks, in lieu of proposing art historical interpretations. "I like it"; "It looks nice"; "I think it's pretty"; and "It's really pretty" were quite common responses. These responses were applied to a wide range of artworks as diverse as Michelangelo's *Pieta*, the U.S. Capitol, Mesa Verde ruins, Gainsborough's *Blue Boy*, Raphael's *School of Athens*, the Guggenheim Museum, a Buddhist stupa gate, Jefferson's Virginia Capitol, Chagall's *I and the Village*, Chartres cathedral, a Byzantine mosaic, Burnham's Flatiron Building, an Islamic tile decoration, an African mask, and Van Gogh's *Starry Night*.

Most of the 100 reproductions from which students selected artworks for study were not in color.[7] Students often chose to study black and white reproductions. Even so, some attraction to color is clear in responses like "I like the color" and "the color was nice," and "I like the color in the sky [Van Gogh's *Starry Night*]."

Responses of second graders in this study did not often evidence the "freewheeling associative response to subject matter" that Parsons describes, though some free association was expressed by a few students. Commenting about Burnham's Flatiron Building in New York, a second grader noted "we like tall buildings. I like elevators." Another student imagined that an ancient Chinese ritual bronze vessel "would scare away people breaking into their house."

Some students seemed to project their own responses to an artwork onto persons of the era when the work was made. One student clearly made no distinctions in perception as she responded to Boucher's *Madam Pompadour*. She answered the four art historical interpretation questions as follows: the artist wanted it to look the way it does "to be pretty"; the viewer back then wanted to look at it because "it was pretty"; people in general back then "liked it to be pretty"; and how I see it differently from the viewers back then is that "I think it's pretty." Another student imagined that the Chinese bronze "made them [historical viewers] feel warm inside because they knew someone in their land made it." Another second grader seems to have projected his own difficulty in understanding Rivera's *Man at the Crossroads* into his art historical interpretation. In response to the historical artist question he responded "he had to show two ideas that he had from different countries." Presumably this response reflects the student's understanding of teacher comments. His historical culture response was that "people worried about two kinds of government." In explaining how he saw the work differently from viewers back then, the student responded "I don't know about the governments." In response to the historical viewer question, he concluded that viewers back then wanted to see it because "it's interesting—they couldn't understand it." This student's series of responses seems to evidence the persistence of subjective projection in association with inadequately understood teacher explanations.

The dominant characteristic of Parsons' (1987) stage one aesthetic understanding which was evident in the responses of second grade students in this study was the "intuitive delight" or overall liking of a great variety of artworks.

Stage Two

Parsons identifies the dominant idea of stage two as subject or representation. He identifies beauty, realism, and skills as grounds for stage two judgments. As noted above many second graders in this study described a great variety of artworks as "pretty" or "nice." The term "beautiful" was occasionally used, though by no means restricted to artworks with realistic subject matter. Among those artworks judged by students to be beautiful were a Buddhist stone gate, a Cree basket, Quetzalcoatl's temple near Mexico City, a Chinese jade decorated with dragons, an elaborately decorated page from the *Book of Kells*, an Islamic tile ceiling decoration, and Chartres cathedral.

A concern for realism appeared only in a few students' responses. For example a student wrote that a Greek sculptor wanted his sculpture "to look real like an archer" and another student, in response to Matisse's *Green Stripe*, noted that "we don't have colors on our faces—our faces are not two-sided," apparently applying realism as a standard. About a prehistoric painter a student proposed "he tried to make it look like an animal."

Skill was seldom used to support conclusions by second graders in this study. One student may have been supporting her appreciation of an Islamic tile decoration by her reference to the effort of the artist when she stated "this is not my religion—it is a lot of hard work."

Parsons describes a typical stage two understanding as "transparent" that is, "as a window through which we look at something else. We do not focus on the window, but on what lies beyond it. We look through, but not at, the window" (1987, p. 39). A few second grade students in this study showed some evidence of an historical type of transparent viewing. They seemed to understand the artwork as a transparent window into the past (Erickson, 1994, p. 75). Two students seemed to understand Boucher's *Madame Pompadour* as a window into eighteenth century France as they responded "they [people in general back then] liked it to be pretty—people were pretty" and "they [people in general back then] liked pretty dresses and reading." Several students seem to have viewed Renoir's *Le Moulin de la Galette* transparently as they wrote of the thoughts and beliefs of people in general back then: "they like to have a good time outside"; "like to dance and have parties"; "they liked to spend time outside and with friends"; and "they had fun and danced." Writing about Horace Pippin's *End of the War*, another second grader proposed that "they [people in general back then] were mad and fighting" apparently viewing the painting of soldiers in World War I as a transparent window to that time.

Perhaps the relative rarity of transparent responses in this study was due in part to the wide range of artworks from which students selected their four artworks for detailed study. Whereas Parsons' eight artworks were all representational paintings, the 100 artworks used in the present study included representational and nonrepresentational two-dimensional and three-dimensional artworks, as well as many architectural and craft works. In addition second graders in this study participated in an extensive inquiry process with each artwork before writing their responses to the four art historical interpretation questions. Early in that inquiry process students were asked to consider whether the image they were studying pictured a two or three dimensional original, and what size the original might be. Parsons writes that individuals viewing artworks transparently "pay little attention to the medium—the lines, texture, form—and a lot to the subject" (1987, p. 39). Second grade students in this study completed questions about the sensory, formal, technical, and expressive qualities, as well as subject matter elements, of each of the four artworks they choose to study. In spite of these reproduction and description questions, a number of students' responses, nevertheless, evidenced historically transparent viewing.

Stage Three

Parsons identifies expressiveness as the dominant insight of stage three understanding. At stage three there is a new awareness of the artist and of the viewer. Parsons proposes that at stage three there is "a new ability to grasp their [others'] particular thoughts and feelings. There is also a corresponding awareness of one's own experience as something inward and unique" (1987, pp. 23-24). As described in detail in the first part of this paper, many second grade students in this study were able to consider artworks from an historical artist's or historical viewer's perspective. Also as documented in part one, some second graders were even able to explicitly distinguish their own perception from that of persons living when the artwork under study was made. Yet references to expressiveness were not common among the second graders' responses. Although Parsons accounts for individuals learning to understand the perspective of others through an increased understanding of expressiveness, the extensive art history program within which this study was embedded seems to have offered students another avenue toward understanding the thoughts and feelings of others.

Stage Four

Parsons identifies the new insight of stage four as the understanding "that the significance of a painting is a social rather than an individual achievement. It exists within a tradition, which is composed by a number of people looking over time at a number of works and talking about them" (1987, p. 24). He goes on to state that "Psychologically, the advance here is in the ability to take the perspective of the tradition as a whole. This is cognitively more complex than grasping the state of mind of one individual" (1987, p. 24).

The analysis reported above, documents second graders' sequence of difficulty in interpreting artworks from three historical perspectives: artist, viewer, and culture, respectively. This sequence seems to support Parsons' claim that grasping the perspective of the tradition as a whole (cultural perspective) is more difficult for second graders than grasping the state of mind of individuals (artist and viewer perspectives). However, there is some evidence that a few second grade students were able to consider the effects of tradition on the appearance of artworks. Two students seem to have been able to apply their knowledge of modern art (presumably based on the art teacher's comments) to their cultural interpretations of two modern artworks. About Kandinsky's *Improvisation 35,* one second grader proposed "they [people in general back then] didn't like art with people in it"; and about Pollack's *Autumn Rhythm,* another student commented "the art [back then] didn't have people." Other responses evidencing some rudimentary cultural awareness include the comment that "They [people in general during Michelangelo's time] were religious and liked art about God." The rarity of even such rudimentary evidence of second graders' grasp of general thoughts and beliefs within a tradition lends support to Parsons' conclusion that understanding tradition is cognitively more complex than understanding individuals.

Stage Five

Parsons characterizes stage five understanding as based on the insight "that the individual must judge the concepts and values with which the tradition constructs the meaning of works of art" (1987, p. 25). Not surprisingly, no second graders' attempts at art historical interpretation evidenced the autonomy characteristic of Parsons' stage five aesthetic understanding.

Discussion and Conclusions

Is art history appropriate content for primary school art education? This question can be construed in two quite distinct ways: as a developmental issue and as a curricular issue.

The results of this study call into question the traditional assumption that primary children are not developmentally capable of historical understanding. The cognitively complex task of considering artworks from an historical culture's perspective seems to have been beyond the capacities for most students in this study. However, many students demonstrated an ability to consider an artwork from an historical artist's perspective, and some demonstrated an ability to consider an artwork from a historical viewer's perspective. In fact, results of this study suggest that the transparent viewing Parsons found to be typical of young persons may be counteracted to some extent through systematic instruction about the difference between reproductions and originals and through activities which engage students in describing technical, sensory, formal, and expressive elements, as well as subject matter in artworks. In addition, the results of this study suggest that a curriculim focusing on artworks within their art historical contexts may help students, at an earlier age, to advance in their understanding of the perspective of others.

Even if art history content is more developmentally appropriate for primary children than traditionally assumed, increasing art history content in a primary art program may or may not be a sound curricular decision. The experimental curriculum to which second graders were exposed in this study was information intensive. The art teacher had developed a central role in the curriculum planning of her school and classroom teachers regularly adapted their programs, especially in social studies, to the art curriculum. Such cooperation is not typical of primary curriculum planning. One might argue for the efficiency of waiting to introduce art history instruction until the intermediate years, when social studies curricula traditionally begin to seriously introduce concepts from geography and history. On the other hand, some social studies educators have argued for more effective ways to teach social studies at the primary level (Egan, 1989; Elkind, 1981). Levstik (1981, 1988) and Levstik & Pappas (1987) have argued that an early introduction to cultural understanding may be crucial to later appreciation of cultural and global diversity.

Increased coordination between social studies and art history content in primary grades presents a special problem associated with what Parsons has called transparent viewing and especially with the historical transparent viewing described above. All too often when artworks of the past have been introduced in the social studies curriculum, those artworks have served merely as transparent windows with no attention directed to their qualities as artworks.[8] This study provides evidence of historically transparent viewing. Even with specific instruction distinguishing actual objects from reproductions, some students were confused. An increased use of artworks merely as illustrations may have regrettable results for art education if teachers do not assist children in avoiding historically transparent viewing. Teachers and administrators may believe they have increased their art instruction when, in fact, they may actually be delaying students' development toward aesthetic understanding.

The results of this study lead this researcher to two recommendations regarding the appropriateness of art history content for primary school art education. First, based on primary children's "intuitive delight" in very diverse artworks from throughout time and across the globe, teachers may, with some confidence, broaden the range of artworks (as distinct from art history *per se*) which they choose to include in their primary art program. Second, if teachers decide to include art history (not just historical artworks) in the primary art curriculum, care should be taken that artworks not be trivialized as objects for free association or as transparent windows into other times and cultures, but instead should be presented within their own historical/cultural contexts. The study reported here documents the extent to which some second graders can understand artworks historically. However, the study also suggests that historical understanding may not be typical of primary children but rather may be the result of carefully planned instruction.

Notes

1. Other art historical abilities such as establishing basic facts and explanation of change and difference through time and across cultures are not addressed in this study. For an explanation of art history content as information and inquiry see Addiss and Erickson (1993, pp. 121–132). This study was part of a larger investigation funded by the Arizona Arts Education Research Institute, co-authored with Susan Raymond, who was also the participating art teacher in the study.

2. Multiple sets of reproductions were required for each class and the second grade class was one of three in a larger study. Even though using only full color reproductions would have been preferable, availability of multiple sets of so many color reproductions from the wide range of cultures and eras made a mixture of color and black and white reproductions a reasonable alternative.

3. The Historical Conditioning of Perception Question was too ambiguously phrased to yield meaningful results about students' awareness of the conditioning of perception.

4. The focus on "thoughts and beliefs" in this question implies a narrow definition of culture. A more carefully phrased question, still comprehensible to elementary students if possible, would improve the validity of findings in some future study.

5. Aware of potential difficulties which might arise when religious art was discussed, the participating art teacher and this researcher developed the following art and religion policy, posted in the room and regularly referred to: "When we study art and religion, we study what people believe (or used to believe), not what we should believe."

6. Light claims that "it has been shown that from 6 and 7 years of age children can make judgments regarding others' expectations" (Levstik & Pappas, 1987, p. 46).

7. See footnote 2.

8. Dickinson and Lee describe this practice as treating an artwork "as though it were a window opening onto the past, making it available for direct inspection" (1978, p. 15).

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The Importance of Conversations About Art with Young Children

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Abstract

Young children enjoy talking about art and artists but are often not given the opportunity to do so. Much of the research that has been done in the area of young childrens' art has focused on their art-making activities. Parsons' (1987) framework for understanding art is compared to the responses of children in a summer preschool curriculum that promoted talking about art and artists. Recommendations for teachers of young children are included.

Preschool children are interested in art, in producing their own creations and looking at and talking about the artworks of others. This interest takes the shape of various activities ranging from experimenting with different sorts of media to having meaningful conversations about artworks with others. Although studio activities have historically received a great deal of attention in the literature, from suggestions for curricular activities (Clemens, 1991; Laskey & Mukerji, 1980) to a developmental analysis of the stages of drawing (Lowenfeld, 1947), there has been less emphasis on research into young children's understanding of art. Parsons (1987), however, proposes a developmental theory that traces aesthetic stages of understanding art from early childhood to adulthood. This article will use Parson's theory to interpret conversations about art with young children. It will also examine the research of others interested in young children's understandings of art.

Studies of Art and Young Children

Studies of children's spontaneous art productions have been in evidence for some time (Kellogg, 1979; Lowenfeld, 1947), and have focused on the developmental stages of drawing. Golomb (1993) has studied the developmental stages of three-dimensional production. The emphasis of other popular recent research by Gardner (1989) is on assessment, and that art can facilitate learning in all areas of the curriculum. Studies of how children understand art are less visible in the literature. However, a few art educators have studied young children and their ability to engage in the process of art criticism (Barrett, 1992; Cole & Schaefer, 1990; Piscitelli, 1988). These studies supply evidence that young children both enjoy and are capable of engaging in meaningful discussions about artworks.

Golomb (1993) suggests that young children possess an awareness of the symbolic meaning of graphic language. She compares a child's fantasy play, where a banana might represent a telephone in a make-believe context, to the act of drawing people or other objects as graphic symbols that represent a more complex concept. In her words:

> Thus the invention of a meaningful graphic language rests on an understanding that symbols "represent," and that they are not to be mistaken for the actual object they refer to, that is, that the symbol and referent are to be distinguished. (p. 2)

Golomb's suggestion that children understand the nature of symbolic representation is an invitation to further study into what children really do understand about art. The assumption that children are too young to interpret or assign meaning to art might be the result of the historical focus on production within research on young children and art. Pri-

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marily, researchers have studied the art productions of young children and have not attended to the conversations that children often engage in on art related topics.

Schiller (in press) finds a strong relationship between language development and talking about art with elementary-aged children in special education, and predicts that art and language are natural allies within curriculum for any child. She finds that children enjoy talking and writing about art and that art can be a motivating force for children with special needs. As shown above, the notion that children's conversations about art might be as interesting as their art productions is an idea echoed by many in various contexts.

The Need for "Talking-About-Art" Activities

In a recent National Art Education Association (NAEA) Briefing Paper, Colbert and Taunton (1992) describe what they consider to be the components of a quality art program for young children. The three components are:

1. Children need many opportunities to create art.
2. Children need many opportunities to look at and talk about art.
3. Children need to become aware of art in their everyday lives.

According to Hagaman (1992), "the elementary classroom is as much a place for talk about art as it is for making art" (p. 106). She suggests that conversations should spring from a child's own experience to best provide meaning. Smith (1993) laments that much attention has been focused on understanding the "emotions that underlie children's artwork" (p. xiii) in lieu of focusing on the cognitive process behind children's painting. She has specific suggestions for dialogue that can be used to help young children fully realize the meaning of their own work. For example, very young children ages 1–3 might benefit from descriptive comments of their work such as, " 'Look, here is a patch of yellow, how bright it looks next to the grey color' " (p. 22). For slightly older children, ages 3–5, brief conversations after a painting is complete concerning the "visual-graphic elements, their repetitions and variations" (p. 30) might be of help. Smith stresses the importance of supplying young children with the vocabulary that will enable them to talk about their work as part of these post-production conversations. Thus, the ideas of two well-known art educators support the recommendations of Colbert and Taunton in their briefing paper.

Most preschool educators are aware of the first component in the NAEA Briefing Paper; opportunities to create art. Within the professionally accepted curricular guidelines of the National Association for the Education of Young Children (NAEYC), the recommendations for art curriculum echo Colbert and Taunton's (1992) first theme. The publication, *Developmentally Appropriate Practice in Early Childhood Programs Serving Children from Birth Through Age Eight* (Bredekamp, 1987), describes appropriate practice for children ages four and five in the area of aesthetic development in this way:

> Children have daily opportunities for aesthetic expression and appreciation through art and music. Children experiment and enjoy various forms of music. A variety of art media are available for creative expression, such as easel and finger paint and clay. (p. 56)

Preschool educators follow these widely accepted guidelines, need only to provide various art media for experimentation, sit back and feel content that they are providing young children with an optimal aesthetic experience in the visual arts. Few preschool educators are aware of art educators growing support for the practice of talking about art activities.

Many have no idea that young children are quite capable of and actually enjoy talking and learning about professional works of art. Talking about art activities can indeed meet the requirements of Developmentally Appropriate Practice (Schiller, in press).

Parsons Theory of How We Understand Art in Relation to the Present Study

Parsons (1987) has made an in-depth study of the way people come to understand art and contends that this process can begin at a very early age if children are given opportunities to see and talk about art. He explains his position on young children's inherent expertise:

> I hope that my analysis makes it clear that young children respond aesthetically from the beginning, and that their response is clear and untaught. They naturally take delight in appearances, a delight that is aesthetic in character. . . . If we took no delight in what we see we would make no meaning of it. (p. 26)

On the basis of ten years of empirical data collection, Parsons' theory describes a series of five stages that focus on four broad topics. He describes the five stages in general terms as (1) favoritism, (2) beauty and realism, (3) expressiveness, (4) style and form, and (5) autonomy. Topics that cut across each stage, but are most salient in a specific stage, beginning with stage two and progressing upward, are subject matter (stage 2); expression (stage 3); medium, form, and style (stage 4); and judgment (stage 5).

In stage one, favoritism, characteristics include "an intuitive delight in most paintings, a strong attraction to color, and a freewheeling associative response to subject matter" (Parsons, 1987, p. 22). Most young children understand paintings at this level, with typical responses consisting of comments such as, "I like it," "It's my favorite color," "I like the pretty colors," or "It's a dog! I have a dog too."

In stage two, beauty and realism, there is an implicit acknowledgment of the viewpoint of others. Subject is the dominant referent, and is alluded to in most responses. Those using stage two would assert that the main purpose of a painting would be to represent something, and that realism represents the best or right style of painting.

Stage three, expressiveness, begins to deal with the "quality of experience" (p. 23) that paintings produce in us. Feelings become important at this stage, whether it is the feelings that we experience upon viewing the work or those that the artist felt or meant to portray. It is acknowledged in this stage that the artist sought to represent a mood or feeling as the prime motive in his/her work.

In stage four, style and form, there is an emphasis on medium, form and style. In Parsons' words:

> The new insight here is that the significance of a painting is a social rather than an individual achievement. It exists within a tradition, which is composed by a number of people looking over time at a number of works and talking about them. (p. 24)

People who use the ideas of stage four to understand paintings take the perspective that there are historical and social issues that impact the creation of art. They expect that paintings will be compared with one and other to isolate similarities and differences and that medium, form and style affect the meaning of a work.

In the final stage, autonomy, judgment is of paramount concern. Using this advanced set of ideas to understand works of art is challenging personally as "The result is an alert awareness of the character of ones own experience, a questioning of the influences upon it, a wondering whether one really sees what one thinks one sees" (p. 25). These activities invite dialogue and at times argument from others who use the characteristics of stage five.

Parsons describes his set of stages and their corresponding topics in this way:

> In short, what I describe here are not people, but sets of ideas, or stages. People are not stages, nor are stages labels for people. Rather, people use stages, one or more of them, to understand paintings. It might perhaps be more accurate to say that we can use stages to understand people's understanding of paintings. (p. 11)

Although the examples in this study are from preschool children, and therefore do not represent the full spectrum of response represented in Parsons' theory, young children's responses can be considered comparable to anyone of any age who is just beginning their explorations into the world of visual art and use the characteristics of stage one or two to understand art. Parsons is clear that his stages do not necessarily represent ages, although in general young children use the ideas of stages one and two in their response to art. He states:

> To be twenty years old, or forty, does not guarantee being able to understand in a stage four or five way. To do that we must have had experience with art, experience in which we have worked at understanding a variety of paintings. (p. 12)

Parsons' research focused on understandings of paintings from Picasso, Renoir, Albright, Klee, Goya, Bellows, and Chagall. He assumes that art has an inherent meaning to be taken seriously and has formed a cognitive developmental-stage model that emerged from interviews with respondents of all ages and sophistication in their understanding of visual arts. The scoring system that emerged was sensitive to the respondents emphasis on the four topics: (1) subject matter, (2) expression, (3) medium, form, and style, and (4) judgment. Parsons' stages describe individuals' responses to works of art, however, he states that one of the purposes of his theory is to better inform teachers and parents about the aesthetic development of children. In his words:

> In particular I hope it will help teachers and parents and others who have to deal with young people. It seeks to provide them with a framework for interpreting what others say, and consequently to be able to respond more intelligently to them. (p. 17)

We have used his framework to form a better understanding of conversations with young children in a specific preschool classroom. The conversations presented here are between preschool children aged three through five and their teacher.

Setting of the Present Study

The preschool classroom under study consisted of twelve children, a teacher's aide, and a teacher/researcher, and is located in a city in the American southwest. The children, most of upper-middle class background, were between the ages of three and five. None had entered kindergarten as yet. They were attending a special four week summer school session of their regular year-long preschool program. The special session offered children a curriculum focused on the visual arts which included group and individual activities. The classroom environment contained displays of many professional and student artworks, a large collection of art books, and many resources for producing art.

The teacher of the summer session is an assistant professor of art education at a large midwestern research-oriented university. She and a colleague are interested in the practical applications of talking about art with young children.

Both have prior experience teaching preschool children.

As both teachers and researchers, we anticipate that our understanding of Parson's theory and our personal theories of how to provide comprehensive art experiences to young children have combined to further our understanding of preschool children's responses to art.

The Children's Conversation in Relation to Parsons Framework

At times, stage one understandings have an undifferentiated character of response, as less sophisticated understandings tend to blur distinct categorization. In stage one of Parsons' theory, young children are constructing an understanding of what a painting is. In addition to understanding art, young children are also beginning to understand the nature of graphic representation in general. Parsons' writes of these understandings in both stages one and two.

> We understand that paintings have meanings, but have no clear idea of how they differ from, say, maps and alphabets. Nevertheless, we recognize many of the objects pictured in paintings. At stage two, we expect that paintings will picture physical objects, and that these objects will be beautiful or interesting. (p. 38)

In the following example, our children appear to be somewhere between stage one and two in their understanding of art. They are exploring the concept of "a painting" with their teacher. The children had been discussing the artists with the "Ninja Turtle" (a popular cartoon that uses the names Leonardo da Vinci, Michelangelo, Raphael, and Donatello for its characters) names as a Ninja Turtle game was popular on the playground and an effort was made by the teacher to connect art with their experiences. The children were fascinated with the cracks that they saw in reproductions of some famous older artworks. In this exchange a group of children and the teacher are talking about the artist Da Vinci while looking at a children's book about the artist.

Teacher. That's one he painted, what do you think of that?

Child. It looks like it's cracking.

Teacher. It looks like it's cracking . . . any reasons why it might be cracking?

Child. Cause it's old.

Teacher. Yeah, it's old. . . . Oh, look at this, it's a portrait of a woman. Do you think she's rich or poor?

Child. Rich, she has gold things on, necklace.

Teacher. Do you think she's happy or sad?

Child. Happy.

Teacher. How can you tell?

Child. She's smiling.

Teacher. Back then they didn't have cameras to take your picture. If someone wanted their picture taken, someone had to paint it for you.

Child. These aren't good ones.

Teacher. Yes these are drawings, practice drawings.

Child. They don't have any color.

Teacher. They're for practice. Here's one called the "Last Supper." It's one that's done. Now we know that Leonardo is not just Ninja Turtle.

Child. I like Rafael the best.

Most young children have a strong attraction to color, especially bright, pure color. Here are Parsons' (1987) thoughts on color, pertaining to all stages.

> At every stage we love color for its sensuous beauty, in and of itself. . . . There is, however, a difference between that early romance and our later one, the difference between color seen as an element and as form. Early, we see colors as individual beauties, complete in themselves; later, as set in contexts that are rich, complex, and meaningful. (p. 88)

The children and their teacher participated in several "choose a favorite painting" sessions. At first the children focused on color as the dominant reason for choosing a favorite. Here are some illustrations of that phenomena, and an extension that occurred during the dialogue:

Teacher. How do you like this one?

Child. Oh, that's beautiful.

Teacher. You don't like that, Rebecca?

Rebecca. It needs more color in it.

Teacher. Jeffry it's your turn, which one do you like best?

Jeffry. That one, I like the colors.

Teacher. What colors do you see?

Jeffry. Black and pink.

Teacher. Kelly which is your favorite? This one here? Why is that?

Kelly. Pretty colors.

Teacher. Let's see, Noah, do you want to tell us why you like this one?

Noah. I chose this one because it looks like a lot of the colors of the rainbow.

Teacher. Oh, you like the colors of a rainbow. . . . Do you know what? All these flowers were painted by the same person and it's a lady named Georgia O'Keeffe, did you know that? They are paintings, they are not photographs of real flowers, they're paintings of flowers . . . did you know that or did you think they were photographs of real flowers?

Noah. I thought they were out of a painting.

Teacher. How did you know that?

Noah. I knew because you said it.

Teacher. Oh, you knew because I said it. . . . This looks like a picture to you, of a picture that somebody painted. . . . What do you want to say?

Noah. Well, paintings. Drawings made out of paint.

In this exchange the teacher has extended Noah's awareness by referring to the pictures on the bulletin board as "pictures that somebody painted." He explains it back to her as "drawings made out of paint."

Parsons writes that association with the subject is a powerful reason for children to desire to respond to art. This again is a stage one response pattern and visible in the following exchanges.

Teacher. Mary Cassatt made that one. Why do you like it?

Child. Because it has all the water and it kind of reminds me of my vacations.

Teacher. Why do you like that one Meg?

Meg. Because it's pretty. It's a pink flower.

Teacher. You like that one over there Eliza? Do you want to tell us why it's your favorite?

Eliza. Because I'm going to have a new baby and that reminds me a lot of it and that makes me happy.

Teacher. What do you think about this baby? Do you think she's happy or sad?

Eliza. A little happy, a little sad.

The actual painting of the baby was an unsettling expressionist work; the baby's face was green and partially distorted. The child/appreciator was willing to overlook minor obstacles to enjoying the work as it reminded her of a happy forthcoming event. In Parsons' stage one he explains, "Young children rarely find fault with paintings, no matter what their subject or style" (1987, p. 22).

Young children at stage one appear willing to appreciate art of all kinds; realistic, non-objective, or abstract, as in this example of the children's response to Jackson Pollack. These represent typically accepting stage one responses:

Teacher. Do you think he took a brush to paint that or do you think he poured it on?

Child. I think he took a squirt thing and squirted it on.

Teacher. Anybody else have a different idea about how he did it?

Child. I think he did it with a rock.

Teacher. What do you think about this picture that the artist made, do you like that?

Child. Yes. . . . He used black and white and brown to resemble the olden days.

While the teacher is still puzzled by the reference to "olden days," and unfortunately did not pursue the matter, it was clear to her during the exchange that the children were quite taken with the Pollack prints and were very positive in their reactions.

Stage Two and Realism

After many conversations and small group discussions, the children began to evidence a slight change in their responses, a shift towards stage two. At stage two, the dominant idea is that of subject, and that "A painting is better if the subject is attractive and the representation is realistic" (Parsons, 1987, p. 22). After students have understood what a painting is, they want to know what event it is about or what object it is representing. In stage two, the student's criteria for a good painting is realism. There is not often a distinction between the artist and the painting: The child accepts or rejects both. At stage two, the painting is admired for its realism and beauty. Here are some conversations that illustrate the shift toward realism as an essential component to a positive judgment.

Teacher. I brought in another book on an artist named Picasso . . . see how he paints? What do you think of that? Are the colors bright or what?

Noah. It doesn't look real.

Teacher. It doesn't look real at all does it? You'd rather have it look real? Is that the kind of painting you like?

Noah. Yeah.

Teacher. How about you A.J.? Would you like to see that or would you like to see something that looks real?

A.J. Real.

Teacher. I like this. I'd rather see something like this sometimes.

And in another conversation with Faye:

Teacher. Here is an artist named Henri Matisse. How do you like this one? Is it the same kind of painting as Michelangelo?

Faye. No.

Teacher. What's different about it?

Faye. It just doesn't look the same.

Teacher. Does it look real?

Faye. No.

Teacher. This one is interesting. What do you think it is?

Faye. Fishes in a glass. I think it's really dark.

Teacher. How come?

Faye. Cause it has glass . . . it's in a glass and fish should be in a bowl.

Teacher. Maybe it's in a big round fish tank, can you imagine something like that?

Faye. No.

At stage two, the possibility of mistakes made by artists is first contemplated. Because the student's likes and dislikes are connected to realism, these issues can become criteria for rejection of the painting (Parsons, 1987). These conversations were inspired by some works of Chagall.

Teacher. What do you think about this painting upside down? Would you like to do a painting with a head upside down?

Child. No.

Teacher. Look at this person, what's that person doing here?

Child. Walking upside down.

Teacher. Somebody's walking upside down . . . do you think he did that on purpose or by accident?

Child. Accident.

Teacher. I can tell you, I know he did it on purpose . . . he wanted some people to be upside down and some people to be right side up . . . how do you like that? Kind of weird, huh? I'm going to show you a different picture. Look at the guy's head. . . . What's different about the guy's head?

Child. It's green and it's upside down.

Teacher. What do you think about this painting upside down? Do you like it?

Child. NO!

Teacher. How about this one?

Child. That looks like a woman . . . I like this one.

Teacher. Does it look like a real one or something he imagined?

Child. It looks like a real one.

What Have We All Learned?

The children were comfortable having conversations about art at this point, during the last week of the session. They began to express their likes and dislikes freely and came to the teachers regularly to discuss paintings in books or their own creations. The environment encouraged conversations about art, and in the short four week experience the children began to explore their own understandings of art. During the last few days, many of the children were anxious to share their plans to become artists "when they grew up." Here is an excerpt from one of those final discussions:

Teacher. Tommy, what did you want to tell us about being an artist?

Tommy. I want to make pictures of everyone.

A.J. I want to paint pictures.

Teacher. What are your pictures going to look like?

A.J. I'm going to paint animals.

Teacher. Christy, you said you wanted to be an artist. What are you going to do when you're an artist?

Christy. I'm going to paint pictures of Toto and people.

Teacher. Faye, didn't you tell me that you wanted to be an artist too?

Faye. Yeah, I'm going to do statues.

Teacher. Oh, so you're not going to do paintings you're going to do sculpture.

Faye. Right.

Discussion and Recommendations

Parsons' stages of aesthetic development are useful as a framework for understanding and promoting conversations with young children about art. It appears that some of the children in this study were more inclined to use the concepts of stage two toward the end of the summer session perhaps partially as a result of having the opportunities to talk about art and knowing that this talk was valued by their teachers. Although this phenomena might be apparent in this particular situation, it should be stressed that moving young children through stages at an advanced rate was not the objective of this study. Preschool children are often not ready to move on to stage two, with its emphasis on realism. In this particular situation, some of the children were ready and used the framework of stage two in their individual process of understanding the meaning of art for themselves. Many of the children in the summer program were content to grapple with questions of graphic representation and continue their joyful responses to color and design, regardless of realism.

The real purpose of this study was to demonstrate that young children enjoy talking about art and do so quite willingly when provided with the opportunity to talk and discuss with peers and adults. It is the teacher's job to listen and interpret. The teacher in this study kept a daily journal of classroom events. She made the following observations in her attempts to listen and interpret carefully:

> After looking at the pictures in the two books, the children asked to see the pictures on the shelf behind me. We looked at three or four of the Matisse prints when four year old silliness and giggles took over. I was surprised that the discussion had lasted so long (almost half an hour!). What was interesting was that the children instantly recognized that Matisse had a very different style than the realism of Michelangelo and Da Vinci.

These observations were dependent on the teacher's ability to observe and interpret the children's reactions to conversations about art. On another occasion, the teacher mentions her observations of a quiet yet observant three year old child, Eric, whose first language was not English.

> At the writing and bookmaking center, Eric was drawing very seriously. I listened in to his conversation with himself as he drew. It went something like this (I did not have the tape recorder on at this point): "Here are the roses and here are the dead ones (a reference to our science experiments of last week), and this is the old picture, here are the crack, there are lots of cracks, and here is the old boy, he is very old. He is lying down and his legs are here and so are his feet." The statements about cracks in his "old" picture came from our discussion of the old Michelangelo paintings and the "old boy" reference probably came from our discussion that the Michelangelo and Leonardo artists were much older than the Ninja Turtles. Eric had been fairly quiet during our discussion but had apparently listened well. I'm glad I had the opportunity to observe him at work because I wasn't sure if he was keeping up with our conversation.

In observing Eric and listening to his dialogue with himself, the teacher was able to revisit subjects and concepts that interested him. Careful observation and listening can provide teachers with clues necessary to understand how to proceed with individual children.

The first and most important recommendation we could offer to teachers would be to listen to children. In listening we learn a great deal and can then respond with an understanding of what a child may be investigating. However, we can listen only if opportunities are provided for children to look and talk about art and artists. First, provide opportunities for discussions and then listen to gain an understanding of what young children are thinking. It is only then that teachers can respond with enough knowledge to begin to assist children in their understanding of art and artists.

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Sculpture: The Development of Three-Dimensional Representation in Clay

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Abstract

The development of three-dimensional representation in clay was examined in a study that involved 109 children, ranging in age from 4 to 13 years, and 18 college students. The study was designed to test two alternative hypotheses of the order in which three-dimensional concepts develop in sculpture. The linear-graphic hypothesis specifies a sequence from one- to two- to three-dimensional representation; the global-modeling hypothesis predicts an early, albeit primitive three-dimensional conception. Subjects modeled 8 different tasks: Cup, Table, Man, Woman, Person Bending, Dog, Cow, and Turtle. Results indicate significant task and age effects on scales that assess dimensionality, figural differentiation, construction style, and type of representational model. These findings suggest that three-dimensional conceptions of uprightness and multiple sides emerge early on in the developmental sequence and document a previously unsuspected early competence in this domain. Within this medium, differentiation of dimensions proceeds from a basic, albeit primitive three-dimensional concept. The data do not support the hypothesized developmental sequence from one- to two- to three-dimensional representational conceptions in clay.

Sculpture: The Development of Three-Dimensional Representation in Clay

The study of the development of three-dimensional representation presents a paradox in that drawing, rather than a three-dimensional medium, has been the major focus of research. Drawing is a medium that lacks the third dimension and requires special tricks of the trade to create the illusion of volume and of multiple sides, and thus presents a special problem for examining the development of three-dimensional concepts. It is in the domain of drawing, however, that considerable efforts have been made to map children's ability to represent three-dimensional objects, with authors generally delineating a slow progression from a two-dimensional depiction drawn in orthographic projection to the representation of additional sides suggestive of the volumetric properties of objects and their multiple sides.

Childhood drawings are based, quite typically, on two-dimensional strategies that may lead to transparencies, line overlap, mixed views, and a tendency to align items side by side on one or more horizontal axes. Most commonly, these graphic styles have been interpreted as symptoms of cognitive immaturity (Piaget & Inhelder, 1956), or ascribed to production problems (Freeman, 1980). Alternatively, the early two-dimensional forms have been viewed as comprising a meaningful stage in an evolving process of visual thinking and graphic problem solving (Arnheim, 1974), which leads to the gradual acquisition of drawing and notational systems (Nicholls & Kennedy, 1992; Willats, 1977, 1985). Unlike the extensive study of drawings that form the basis for these diverse interpretations, children's representation in clay has been largely neglected. The reasons for this neglect are not difficult to discern. It is a technically difficult and somewhat messy medium to work with, and clay figures handled by inexperienced children tend to fall apart. The collection of clay figures, their transport, preservation, and storage present considerable problems and require much time and effort on the part of the investigator. By comparison, the study of children's drawings does not face the difficulties mentioned above. Thus, the domain of three-dimen-

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sional representation in sculpture has not received much attention and little is known about its development. On the basis of his analysis of prehistoric sculpture, Arnheim (1974) hypothesized that such development might begin with the use of one-dimensional sticks, progressing to a two-dimensional representation composed of sticks and slabs arranged within one plane, and finally to patterns in more than one plane that represent the cubic body in the third dimension.

If one were to transpose this view of the historical antecedents of sculpture to the developmental domain, one might conceive of the sticks and/or snake-like shapes children roll with playdough or clay as equivalents for one-dimensional lines, the pounding or flattening of the clay which produces a thin flat layer as an equivalent for a two-dimensional region on a page, representing a two-dimensional conception, while modeling all sides of the cubic object would indicate a three-dimensional approach to sculpture. In the limited number of publications, mostly devoted to building with blocks, this position seems to have received some qualified support. Reifel, in an earlier study (1982, 1984), and Wolf (1988) reported on a developmental sequence in block building that begins with constructions that are equivalent to one- and then two-dimensional lines and regions, and only gradually progresses to a three-dimensional representation of objects. In a more recent study, Reifel (1992) has revised his position because he could not replicate the findings on the proposed dimensional progression in block construction.

This model of dimensional development presented so far, while plausible, is somewhat at odds with findings from a previous study of modeling the human figure with playdough (Golomb, 1972, 1974). This study focused on attempts of young children to model upright standing figures, and concluded that their global and often volumetric models indicate an early, albeit primitive attempt at three-dimensional representation. Perhaps, the hypothesized progression from one- to two- to three-dimensional representation rests on a mistaken application of the principle that development proceeds from simple to complex (Arnheim, 1974; Werner, 1957). The principle of simplicity may have different implications for different media and tasks. In the two-dimensional medium of drawing, the third dimension is missing and cannot be represented in a direct way, which presents the pictorial medium with its unique problem. However, the restrictions that apply to the domain of drawing need not affect the three-dimensional medium of clay. Thus we consider two alternative hypotheses about the development of three-dimensional representation in clay which lead to opposing predictions regarding the stance or posture of the figure and the number of sides modeled.

Hypothesis 1, the linear-graphic hypothesis, states that development in modeling proceeds in a somewhat linear fashion from one- to two- to three-dimensional representation. Based on studies on drawing development (Cox, 1992; Freeman, 1980; Winner, 1982) and a number of studies on block construction (Reifel, 1982, 1984; Wolf, 1988) this hypothesis predicts that children's early figures will consist of one-dimensional sticks and flattened regions, and that the representation of volume, of multiple sides, and upright posture will be a later achievement. This hypothesis emphasizes the representational constraints on the young child's modeling behavior.

Hypothesis 2, the global-modeling hypothesis, states that development begins with an early, albeit primitive three-dimensional conception of uprightness and attention to the multiple sides of an object. It bases its prediction on observations derived from a previous study of modeling (Golomb, 1972, 1974) and on a closer analysis of the object most commonly studied, the human figure.

The human figure, with its disproportionately long and relatively spindly legs that have to support a substantial torso, is a complex, and difficult to model object.[1] It is not neutral in terms of its "sides," and its representation favors the canonical view of the object, that is, the frontal plane with its bilateral symmetry, and its front-back asymmetry. The fact that this figure is difficult to model in an upright standing posture, and that its frontal plane is often singled out for differential modeling, need not signal the existence of intrinsic cognitive constraints on the child's three-dimensional conceptions in sculpture. Previous studies did not consider the above mentioned variables and failed to differentiate between technical or skill related problems and conceptual limitations (Brown, 1975; Golomb, 1974; Grossman, 1980; Reifel, 1984; Reifel & Greenfield, 1982; Wolf, 1988). The present study examines the two opposing hypotheses about the development of three-dimensional concepts in clay, and makes a first step in the identification of task variables that affect the child's attempts to model a clay figure.

Our aim was twofold: (a) To determine the order in which representational concepts emerge in the medium of clay; (b) to clarify the impact of selected task variables on the child's ability to represent objects in a three-dimensional manner. The question of order concerns the nature of the developmental progression as specified by the two hypotheses. We decided to address the issue of the order of stages in the development of three-dimensional representation in terms of the figure's posture (upright standing or placed horizontally on the table top) and the child's attention to the multiple sides of the modeled object.

In terms off task variables, previous studies on drawing development have demonstrated significant task effects in this domain (Cox, 1981, 1992; Golomb, 1973, 1992; Light & MacIntosh, 1980; Light & Simmons, 1983), which have implications for the study of modeling. Hypothesis 2, the global modeling hypothesis, addresses the issue of the demand characteristics of modeling tasks in the following statement: The translation of the child's three-dimensional conception of the object into a clay representation will be affected by the nature of the object, its complexity, symmetry, the technical difficulties of balancing the figure, its familiarity, and the availability of practiced representational models. Of these variables, complexity refers to the number and arrangement of differentiated elements that comprise an object, symmetry to the number of sides of the volumetric object that have the same or similar characteristics, balance to the construction of a free-standing sculpture, and familiarity refers to knowledge of the object and/or its representation. The variable of balance is quite specific to the clay medium, while familiarity and complexity are more general in nature although they too affect representation in the clay medium in unique ways. Thus, for example, familiarity with drawing may predispose a child who has not worked with clay to rely on a well-practiced graphic model and transpose it into the three-dimensional medium, while complexity (the number of parts, their proportions, and internal relationships) may affect a figure's balance.

We predicted that a simple, symmetrical, balanced, and familiar object will be modeled three-dimensionally, with attention to its multiple sides and an effort to stand the clay figure upright. In the case of more complex objects, we predicted that symmetry of side and the extent to which a figure could be balanced would facilitate three-dimensional representation. Finally, on the basis of previous findings (Golomb 1973, 1974, 1992) we also predicted that the child would be sensitive to the meaning of an assignment. Where its meaning increases in specificity, the tendency to model the figure upright would also increase.

We selected 8 tasks that varied along the dimensions we had tentatively identified as affecting three-dimensional representation in clay figures. The tasks consisted of modeling a Cup, Table, Man, Woman, Person Bending, Dog, Cat, Turtle.

According to our analysis of potential task effects, objects that are familiar to the child, simple in construction, easily balanced, and have symmetry of sides, are the most likely candidates for successful three-dimensional modeling. These conditions apply most fully to the Cup and the Table, with the Table more complex in its construction than the Cup. The Cup can be modeled by turning the ball of clay, indenting its center, and flattening its bottom to make it stand. The Table requires more planning in the modeling of separate parts: flattening of a lump of clay to serve as the table top, modeling of four separate pieces to create the legs, and attaching the five pieces to yield a balanced upright standing structure.

Animals are more complex in structure than Cup or Table in terms of the number of differentiated parts and their arrangement. They are relatively stable in structure, with bodies resting on four legs placed perpendicular to the horizontal axis of the body. Animals are also quite symmetrical with two major sides (the long sides) near duplicates of each other. Instead of a dominant canonical view that favors a single side, in four footed animals there is a competition between frontal and side views (Golomb & Farmer, 1983; Ives & Rovet, 1979). To the extent that symmetry facilitates three-dimensional representation, and in the absence of a single dominant view, we might expect a more comprehensive representation of sides in animals, and a greater tendency to construct the object standing upright.

Among the animal figures, the Dog and the Cow vary somewhat in terms of familiarity. Most children have encountered real life dogs and numerous pictures of this animal, while cows may be less directly familiar to urban children, and mostly known from toys and pictures. In terms of its overall structure, the major body parts include head, body, legs, and tail, two prominent sides (long sides) that are near-identical, and the figure can be balanced on its four legs. A similar set of conditions applies to the Turtle. It is a familiar object (often a pet) composed of head, body, legs, shell. The relationship of body inside or underneath the shell tends to make it a more complex object of representation.

Finally, the human, though the most familiar object, is also the most complex one in this set of tasks. Its structure is mostly organized along the vertical axis, and includes as major parts head, body, a set of arms and hands, legs and feet. By contrast with animals, the dominant sides or regions of the human figure are quite distinct with marked differences between its front and back sides. Its structure calls for the representation of frontality (its so-called canonical view); the relatively disproportionate parts aligned along the vertical axis make it difficult to balance. With added specification, however, by defining a human engaged in an action of bending down, the instruction calls the child's attention to posture and may thus facilitate upright representation and attention to multiple sides.

Thus, in terms of our specific tasks, we predicted that dimensionality scores on the Cup and the Table would exceed those of Animals, which in turn would exceed the scores on the Person Bending, with Man and Woman figures receiving the lowest scores.

We also predicted age effects in the skillful manipulation of the material, and in the differentiation of the human figure and its parts, with older children creating a more detailed representation. However, a detailed representation of the human figure was expected to conflict with the need to balance the figure in an upright stance. Thus, in terms of the human figure's posture, we predicted a *U*-shaped curve, with the youngest representational children modeling the human figure crudely, in an upright fashion, with little differentiation of its parts. By contrast, we predicted that the older children (third and fourth graders), who aim for a more detailed representation, would construct their figures in a horizontal position. We assumed that our oldest children and the adults would be able to coordinate differentiation of parts and balance, and thus once again plan their figures in an upright standing fashion.

Method

Subjects[2]

A total of 109 children, 55 girls and 54 boys, ranging in age from 4 to 13 years participated in our study. The children came from a largely middle class socioeconomic background. They were enrolled in two preschool centers and two elementary-junior high schools, kindergarten through seventh grade. They constituted five groups: 17 preschoolers, mean age 4.5; 20 kindergarten children, mean age 5.6; 29 first and second graders, mean age 7.3; 20 third and fourth graders, mean age 9.3; 23 fifth and seventh graders, mean age 11.8 (see Table 1). In the preschool centers, permission was granted for all enrolled 4-year-olds. In the elementary-junior high schools, either intact classes were used, or children were selected at random from the class list for whom permission was then secured.

An adult sample of 18 liberal arts students, 7 males and 11 females, enrolled at an urban university was also included. They came from diverse socio-cultural milieus and their ages ranged widely, with a mean age of 30. Approximately one half of the group majored in the visual arts or took art courses. This was not a randomly selected sample; they were volunteers drawn from art and psychology courses. All participants were seen individually over 1 to 2 sessions.

Tasks and Procedures

Eight tasks were selected and administered in a semi-fixed order. The items to be modeled were: a Cup, Table, Man, Woman, Person Bending Down to Pick up a Ball, Dog, Cow, and Turtle. These tasks refer to common objects familiar to the child either by direct contact (Cup, Table, Humans, Dog) or at the very least from toys, stories, and illustrations (Cow, Turtle). The first two tasks served, in part, a "warm up" function to familiarize the younger children with clay and to facilitate the discovery of what can be done with this medium. The Cup and the Table are familiar and symmetrically constructed objects; they vary in terms of complexity, with the Cup simpler in its structure and easier to produce than the Table, and balance affecting the Table more than the Cup. Following these tasks, children were asked to model three humans: a Man, a Woman, and a Person Bending Down. The order of the Man and Woman tasks alternated as third or fourth assignment,

Table 1. Distribution of Age and Gender for 6 Groups

		Gender			
Group	N	Females	Males	Age Range	Mean Age
A: Preschool	17	11	6	4.0– 4.9	4.5
B: Kindergarten	20	9	11	5.0– 6.3	5.2
C: First/Second	29	13	16	6.1– 8.11	7.3
D: Third/Fourth	20	10	10	8.1–10.5	9.3
E: Fifth/Seven	23	12	11	10.1–12.11	11.8
F: Adult	18	11	7	19 –62	30

and was followed by the Person Bending. The order of the three animal tasks was counterbalanced.

All the children were seen individually and, with the exception of the seventh graders, were tested by one of two experimenters (the authors). The seventh graders were engaged by a graduate student who had been trained in the administration of the tasks. For each task, the child was provided with a ball of clay, approximately 3½" in diameter. No time limit was imposed. Depending on the child's interest, attention span, and time devoted to each project, all assignments were completed in 1 or 2 sessions.

A detailed record was made of each subject's actions and verbalizations; the sculptures were labeled, identified, and transported, and preserved for scoring purposes.

The same procedures were used with the adult sample and the tasks administered by a trained psychology and art student.

Scoring Criteria[3]

Measures were designed to assess the following aspects of representation: three-dimensional attributes of the modeled figures, method of construction, construction sequence, representational model employed, and level of figural differentiation.

Dimensionality Measures. Two measures addressed dimensionality: the General Dimensionality Scale which is a comprehensive measure, and the Sides Modeled Scale, a more restricted measure.

The General Dimensionality Scale assessed three-dimensionality in terms of uprightness, number of sides modeled, and medium specific strategies, for example, modeling protrusions or hollowing out of parts. This scale was based on a point score system that assigned a weighted value to each item or aspect deemed to specify three-dimensionality. In the case of the human figure, for example, the scale assigned from 1 to 3 points for uprightness (upright intention—1 point, upright standing with support—2 points, upright standing without support—3 points), 1 to 2 points for the differential modeling of facial features (eyes hollowed out, nose protruding), 1 point each for body mass or volume, arms or hands reaching forward, leg bent backwards, body bent, clothes marked by folds, wide sleeves, flaring skirt or other characteristics that indicate that clothes surround or envelop a body, and 1 point for each side of the object that is modeled. A similar scale applied to the animal sculptures.[3]

The Sides Modeled Scale, a subscale of the General Dimensionality Scale, assigned 1 point for each side modeled. This scale used a highly conservative set of criteria to assess the number of sides that were distinctly modeled.

Construction Style. Each figure was classified according to two styles or categories of modeling, and within each style a distinction was made between two levels of differentiation: Low—global figure with minimal differentiation of parts; high—a figure composed of distinctly modeled major body parts. The stylistic differences refer to modeling by internal subdivision and subtraction, or modeling by using an additive procedure.

Representational Model. All sculptures were classified in terms of the representational model employed and assigned to one of six categories. These categories represent various one-, two- or three-dimensional strategies or models of representation (see Figure 1).

Construction Sequence. The spatial land temporal order in which sculptures were constructed was coded as follows: top-to-bottom, bottom-to-top, body first, and other.

Figural Differentiation Scale. Sculptures were scored on a point scale that assigned 1 point for each modeled part (see criteria for the Point Scale in Go-

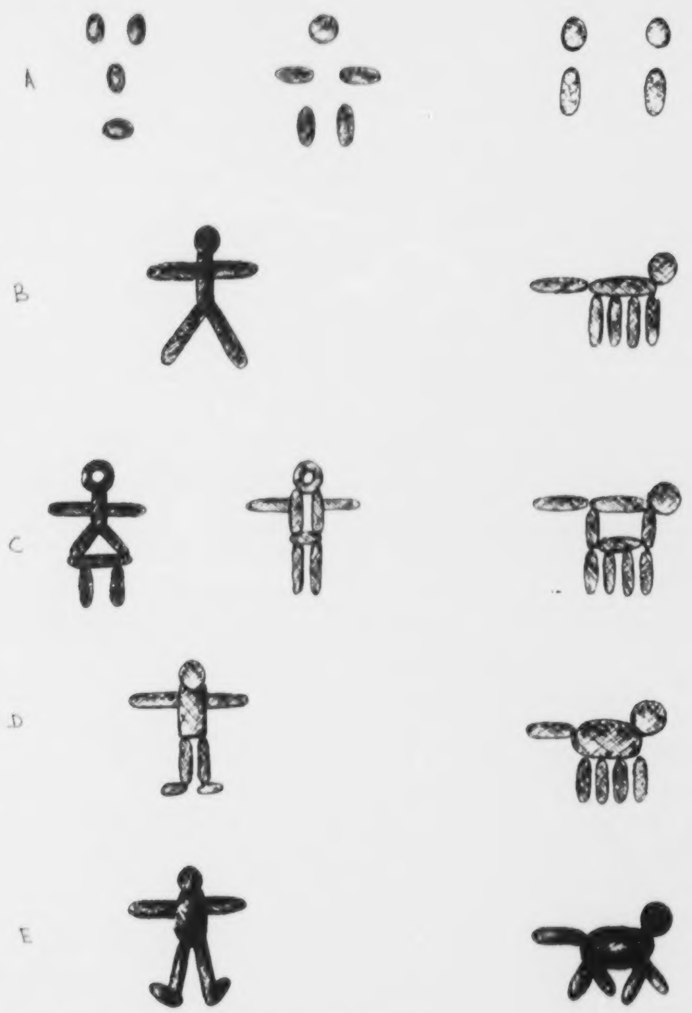

Figure 1. *Representational models of humans and animals:*

A. Primitive one-dimensional representations; parts of human and animal figures are unattached.

B. Stick figures as one-dimensional models of humans and animals. Figures are composed of one-dimensional snake-like parts.

C. Graphic models. Figures are "outlined" with strips of clay that create a distinctly two-dimensional representation.

D. Two-dimensional models. Figures are constructed from solid but flattened slabs of clay, placed horizontally on the table top.

E. Three-dimensional models. Figures are constructed from solid parts, most commonly by holding the figure upright during its construction. Upon its completion, the figure is presented in a vertically upright posture, supported by the artist.

F. Three-dimensional models, free standing figure. Same as Figure E except for its independently upright stance.

lomb, 1973); scores were summed for each subject on each of the 6 tasks.

Each clay figure was scored on the basis of an extensive protocol of the subject's activities during the session in conjunction with a careful analysis of the sculpture that had been preserved for this purpose. The sculptures were scored independently by the two authors and percentage of agreement between the two scorers was as follows: 79.5% on the General Dimensionality Scale (range of scores from 0 to 22), and a mere 1-point difference in 75% of the remaining cases; 95% on the Sides Modeled Scale, 97% on Construction Style, 90% on Representational Model, 98% on Construction Sequence, and 86% on the Figural Differentiation Scale. In those instances where the scores diverged, the sculptures and the protocols were reexamined and a jointly agreed upon score was assigned.

Results

Overall Results

A set of three-way analysis of variance (ANOVA's) examined the effects of the independent variables (age, task, sex) on the dependent measures. The results support our major predictions, derived from Hypothesis 2, concerning age and task effects. On the General Dimensionality Scale age and task effects were statistically significant (age: $F(5, 109) = 7.508$, $p < .0001$; task: $F(5, 545) = 62.72$, $p < .0001$) which was also the case for the Sides Modeled Scale (age: $F(5, 107) = 7.995$, $p < .0001$; task: $F(5, 535 = 25.786$, $p < .0001$). Age and task effects were also significant on the Figural Differentiation Scale (age: $F(5, 109) = 12.681$, $p < .0001$; task: $F(5, 545) = 41.054$, $p < .0001$). Sex effects were only significant on the Figural Differentiation Scale ($F(1, 109) = 5.298$, $p < .0232$).

Age Effects

Dimensionality. Systematic comparisons between age groups using the Fisher Protected LSD post hoc test indicated that the differences were mainly between the youngest and the older subjects. On the General Dimensionality Scale, scores increased for kindergarteners, for the groups composed of first and second graders and third and fourth graders, and then leveled off (see Tables 2, 3). The scores of the preschoolers differed significantly from all groups ($p < .01$) with the exception of the kindergarteners; scores of the kindergarteners were significantly lower than the scores for all groups ($p < .01$), with the exception of the group of first and second graders; scores for the first and second graders differed only from the adults ($p < .005$). On the Sides Modeled scores, the findings closely paralleled those reported for the General Dimensionality Scale with two additional comparisons reaching statistical significance: the scores for first and second graders differed significantly from the scores of fifth and seventh graders, and the scores of third and fourth graders differed from those of the adults ($p < .05$).

The developmental trends highlighted by the group differences ought to be considered in conjunction with the following findings: (a) The increase in Dimensionality scores from the youngest to the oldest children does not signify an absence of dimensional characteristics in the figures of preschoolers. Some attributes of three-dimensionality, for example, uprightness and attention to multiple sides, are understood early on, even by preschoolers. (b) Although the Dimensional scores tended to level off during middle childhood, some differences were noted in the approach of the older children, predominantly the seventh graders. These differences were not captured by our scales, and were not always apparent in the finished product. Detailed observational records reveal that though the

Table 2. Mean General Dimensionality Scores on 6 Tasks for 6 Age Groups

	Modeling Tasks					
Group	Man	Woman	Pers/ Bend	Dog	Cow	Turtle
A (presch)	4.17	4.58	4.08	6.00	5.67	6.75
B (kg)	4.25	6.38	5.25	8.63	8.00	8.06
C (1, 2)	5.11	6.21	8.61	11.25	10.54	9.43
D (3, 4)	7.10	7.20	9.35	12.45	12.60	11.55
E (5, 7)	7.26	7.78	9.44	12.26	11.96	12.09
F (adult)	8.06	8.17	10.77	14.88	14.29	13.71

Table 3. Mean Sides Modeled Scores on 6 Tasks for 6 Age Groups

	Modeling Tasks					
Group	Man	Woman	Pers/ Bend	Dog	Cow	Turtle
A (presch)	.50	.75	.58	1.50	1.17	1.42
B (kg)	.79	1.43	.79	2.00	2.00	1.86
C (1, 2)	1.29	1.29	1.36	2.68	2.36	2.07
D (3, 4)	2.00	2.15	2.20	3.10	3.05	2.50
E (5, 7)	1.96	2.57	2.35	3.13	3.13	2.78
F (adult)	2.82	2.77	2.77	4.18	3.88	3.71

modeling skills of these youngsters often was not significantly better than that of younger children, the older children differed in the persistence with which they made repeated attempts to revise the figure, three or four times.

Figural Differentiation. A similar though somewhat less extreme trend characterized the scores on the Figural Differentiation Scale which increased steadily with age. Comparisons using the Fisher Protected LSD post hoc test showed that though differences in the scores of preschoolers and kindergarteners were not significant, their performance differed significantly from that of all other age groups ($p < .05$). The scores of the groups composed of first and second graders, and of third and fourth graders differed significantly from the group that comprised the fifth and seventh graders ($p < .05$). This was the only measure on which sex differences were found; they were limited to the youngest subjects and favored the performance of girls who included more detail in their sculptures ($p < .05$).

Overall, figural complexity increased with age and development progressed from a global, one-unit figure to more differentiated ones. Differences in the performance of children from the middle childhood years on and the adult sample tended not to be significant. With few exceptions (the art students of the adult sample) the sculptures of the adults bear a strong resemblance to those of our younger subjects, ages 9 through 13 years (see Figures 2, 3, 4, 5).

Task Effects

As predicted, a one way ANOVA on the six tasks with ages combined yielded

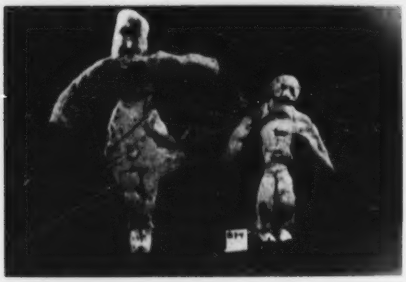

Figure 2. *Woman and man. Artist is a boy, age 7-4.*

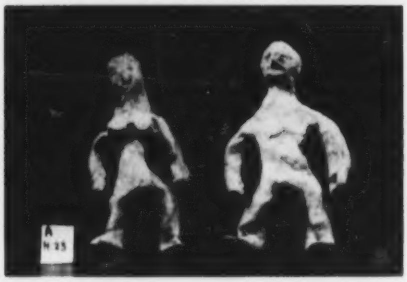

Figure 3. *Woman and man. Artist is a male art student in a liberal arts college, age 23.*

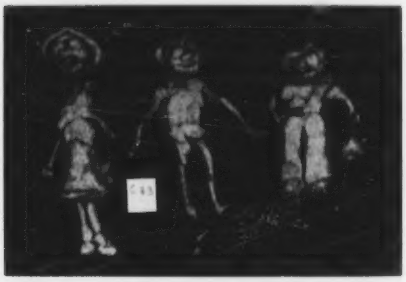

Figure 4. *Woman, man, and person bending with ball. Artist is a girl, age 8-3.*

significant task effects on the General Dimensionality Scale ($F(5, 575) = 70.530$, $p < .0001$). Scores were higher on Animals than on the Humans, and higher on Person Bending than on Man and Woman. On the Sides Modeled Scale, the task effects are also significant and, with the exception of the Person Bending task, closely mirror the results for the General Dimensionality Scale ($F(5, 565) = 29.508$, $p < .0001$). Among the Animal tasks, the dog as the most familiar animal, almost always received the highest scores among all age groups (see Tables 2, 3, 4, and Figure 6).

Age Related Task Effects

On the General Dimensionality Scale, a series of one-way ANOVAs with Repeated Measures yielded significant task effects for all age groups with the exception of the preschoolers. For the kindergarteners, $F(5, 75) = 7.071$, $p < .0001$; for first and second graders, $F(5, 167) = 8.723$, $p < .0001$; for third and fourth graders, $F(5, 95) = 18.656$, $p < .0001$; for fifth and seventh graders, $F(5, 110) = 14.657$, $p < .0001$; for the adults, $F(5, 80) = 19.049$, $p < .0001$. The differences for preschoolers, though not statistically significant, were in the predicted direction ($p = .1042$). On the Sides Modeled Scale, task differences were statistically significant for each of the age groups: preschoolers, $F(5, 55) = 3.792$, $p < .0051$; kindergarteners, $F(5, 65) = 4.824$, $p < .0008$; first and second graders, $F(5, 135) = 11.223$, $p < .0001$; third and fourth graders, $F(5, 95) = 3.789$, $p < .0036$; fifth and seventh graders, $F(5, 110) = 4.089$, $p < .0019$; adults, $F(5, 80) = 5.019$, $p < .0005$. Even the youngest children in this study were inclined to consider more than a single side of the object, especially in the case of the animals. The tendency was to create an upright standing animal with its head and body orientation clearly differentiated (frontal orientation for head, side orientation for body), with some attention to the underside of the body and the modeling of front- and hind-legs. We found few so-called mixed views that align head and body on a single side or plane. Children's comments indicated their intention to make an upright stand-

Figure 5. *Woman and man. Artist is a female college student, age 19.*

ing animal and highlighted the logic that underlies the adoption of diverse dimensional strategies for the different tasks (see Figures 6, 7, 8, 9).

Uprightness. On the first set of tasks, nearly all the subjects modeled the Cup and the Table three-dimensionally and demonstrated effective use of such spatial concepts as "in," "under," "top," and "side." The Cup was rounded on the outside, hollowed out on the inside, and free standing. Although the younger children modeled their object more crudely, they succeeded in portraying the essential three-dimensional character of the Cup. On the second task, the majority of the children, including 4-year-olds, constructed the Table in a three-dimensional manner. Faced with the problem of collapsing legs, many children invented a strategy of inverting the object so that its flattened slab rested on the tabletop with legs extending vertically upright, explaining: "when it is dry and sturdy you can turn it upside down." Thus, on the first two tasks that were relatively simple in structure, familiar, symmetrical, and balanced, almost all of the children created three-dimensional representations, with upright intention as one of the defining attributes of three-dimensionality (see Table 5).

A Chi Square test to determine the effect of age on figural orientation (whether the intention was to model an upright or lying down figure) was not significant ($X^2(30) = 39.311$, $p = .1189$).

Table 4. Mean General Dimensionality Scores for 6 Modeling Tasks

Task	Count	Mean	Std. Dev.	Std. Error
Man	116	6.336	3.901	.362
Woman	116	6.836	4.183	.388
Person Bending	116	8.284	4.564	.424
Dog	116	11.284	4.916	.456
Cow	116	10.871	5.164	.479
Turtle	116	10.483	4.556	.423

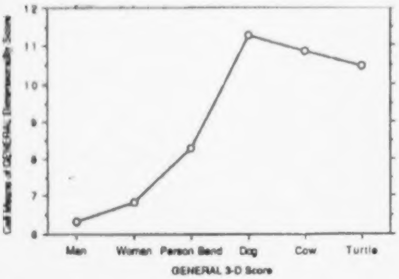

Figure 6. *Mean general dimensionality scores for 6 modeling tasks.*

The data show that the intention to model an upright standing figure was already apparent among the youngest subjects. For the total sample of children, 57% attempted to model the Man or Woman in an upright standing fashion (adults 50%). This number increased to 76% for the Person Bending (adults 100%), and peaked at 83% for the animal tasks (adults 100%). When results are compiled for all subjects combined, we see a consistent increase in uprightness as a function of the nature of the task. However, when we consider the factor of age, the results reveal an interesting pattern. On the hu-

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Figure 7. *Diverse animal models: The Dog is a two-dimensional, flattened, and horizontally placed figure; the Cow and the Turtle are three-dimensional upright standing figures. Artist is a girl, age 5-6.*

Figure 8. *Upright standing animals: A similar model serves for the Dog, the Cow and the Turtle. Artist is a boy, age 5-11.*

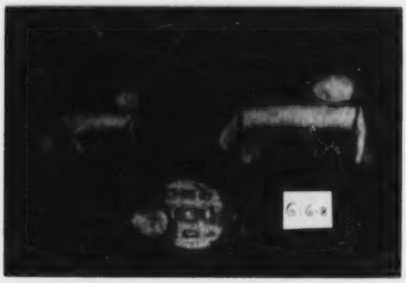

Figure 9. *Faceless, but distinctly modeled animal figures. The sides of the Dog and the Cow are carefully modeled, while the Turtle's shell receives special attention. All figures are upright standing. The artist is a girl, age 6-8.*

man figure tasks, upright intention *decreased* with age: preschoolers had the highest upright intention (71%), followed by the kindergarteners (68%), with all others trailing behind. For the adult group, the percentage of upright humans once again increased to 50%. On Person Bending and the Animal tasks, however, upright intention *increased* with age. These data provide some support for our prediction that the representation of uprightness in the human figure might follow a *U*-shaped curve. These findings suggest that young children, at an early stage in modeling, employ a primitive three-dimensional strategy which leads to crudely modeled upright humans. When children attempt to differentiate their figures and model more diverse parts, they discover the difficulty of constructing complex figures that are difficult to balance. Hence, horizontality is a compromise solution: the figure is more detailed in its construction but is resting on the table top. In the Person Bending task, the inclination to place the figure horizontally is countered by the strong demands for verticality implied in the instruction. On the animal tasks, the child's upright intention can find an easier expression: these figures can be balanced on four legs that provide a stable base for the body.

Representational Models. One-dimensional models were extremely rare: we only found a single example of unattached snakes or pieces of clay (category A), and very few stick figures that, in analogy to one-dimensional lines in drawing are characterized as one-dimensional in clay (category B). With few exceptions, the stick figures were modeled by somewhat older children, from third grade on. A two-dimensional "outline" or graphic model that creates a contour with thin strips of clay (category C) appeared infrequently, and was mostly limited to preschool and kindergarteners. The solid but flattened figure (category D) was employed more frequently (between 10–26%) but no clear age trends could be dis-

Table 5. Upright Position on 6 Tasks in Percentages

Task	Child Sample	Adult Sample
Cup	96.1	100
Table	81.3	100
Animals	83.2	100
Person Bending	76.2	100
Humans	56.9	50

Note: Upright position refers to the intention to model an upright standing object. It includes free standing figures, figures standing with support, and figures held upright.

cerned. The majority of our participants created three-dimensional models that were held upright, free standing, or standing with some support (categories E and F) (see Figure 1).

Construction Style and Sequence. Construction styles, that is the manner in which the figure was composed, involved two strategies: internal subdivision of the lump of clay by pinching, pulling and subtracting clay from a single unit or addition of separately modeled parts. The majority of figures were constructed by a process of addition of separately modeled parts; no clear age trends emerged in terms of a preferred construction style. As was to be expected, figural differentiation increased with age regardless of the style employed.

The majority of humans were constructed in a top-to-bottom sequence; next came the inverse order of bottom-to-top, followed by a sequence that began with modeling the body first. In terms of animal figures, the majority selected the body as the first part to be modeled.

Summary and Discussion

Our major questions concerned the development of three-dimensional concepts in modeling with clay and the order in which dimensional strategies emerge. The results support hypothesis 2, the global modeling hypothesis, and indicate that when children become representational in this medium, approximately during their fifth year of life (Gardner, 1980; Golomb, 1974, 1992; Kellogg, 1969; Winner, 1982), they exhibit some basic three-dimensional understanding, witness their attention to the volume of a figure, its upright stance, and attention to multiple sides. The flattened, horizontally placed human figures appear to be a somewhat later development, a function of experience with this difficult medium and the ambition to create a more complex and differentiated figure. However, even then the tendency to work horizontally on the figure's frontal side is counteracted on the Person Bending and Animal tasks that override it. It is most striking to observe the differential treatment which the same child applies to our eight tasks (see Figures 7, 8, 9). Thus, the previously held notion that the singular attention to frontal aspects of the human figure represents the child's conceptual limitation regarding dimensionality seems no longer tenable. When children develop graphic and plastic representational concepts, three-dimensional representation in clay appears not to follow the hypothesized linear progression from one- to two- and then three-dimensional representation (hypothesis 1). Instead, they seem to begin with an incipiently three-dimensional conception that becomes gradually refined and differentiated, provided the child is exposed to this medium and experiments with various tasks and possibilities (hypothesis 2).

It is perhaps surprising that the process of differentiation in modeling tends to level off from, approximately, ages eight or nine years on. Even the sculptures of our educated adult sample show this leveling effect, with 50% of the human figures placed horizontally on the table top, and attention focused on the frontal side of the human figure. This leveling off effect is similar to that found in drawing; only in the case of continued practice and the motivation to acquire new representational skills do the drawings of adolescents and adults show a progression beyond the typical drawings of middle childhood. These factors may well lead to a similar phenomenon in modeling with clay.

We had predicted that young children's modeling of familiar objects that are simple in structure, symmetrical and easily balanced would reveal an early three-dimensional conception and competence. We expected to find evidence for the child's intention to model her figures in an upright fashion, and some attention to the multiple sides of the figures. Indeed, the Cup and the Table met all these conditions and, though first in order of assignment, were modeled three-dimensionally with the Cup exceeding the Table in terms of its representational success. Animals that are familiar objects, relatively symmetrical in structure, and potentially balanced, came next in terms of standing posture and attention to sides. Finally, the human figure which, though familiar, is complex in its structure, asymmetrical in terms of sides (front and back) and difficult to balance, was less likely modeled in an upright fashion, and attention focused mostly, though not exclusively, on its frontal aspect.

These findings provide us with some answers to questions posed earlier regarding the order of the developmental progression, models employed, the variables likely to affect representation of side and posture, and the conceptions which underlie the child's representational efforts in the tasks we selected. We found very little support for the view that considers the early and primitive representations merely as expressions of cognitive immaturity, and much evidence that the young artist struggles with problems older children must also confront: how to create a satisfying representation in a medium that puts a premium on balance, uprightness, and the modeling of multiple sides, all of which require great skill and practice.

In summary, in this exploratory study, which defined its variables qualitatively, our predictions concerning task effects were supported. It appears that children start with some simple three-dimensional representational conception of the modeling task. When their ambition to create greater likeness and complexity militates against the upright posture of unbalanced figures, they employ what appear to be two-dimensional strategies and models. This analysis of the developmental progression runs counter to the earlier published accounts (Arnheim, 1974; Brown, 1975; Reifel, 1982, 1984; Wolf, 1988). The so-called two-dimensional or graphic models in clay appear somewhat later; they reflect the impact of drawing and the child's experience with the technical difficulties of the medium. In our study, 4-year-olds who made the transition to representation in the clay medium employed a three-dimensional conception when modeling their figures; though crudely shaped, they tended to be upright, and represented up to six sides of the object.

Beyond a delineation of representational development in the three-dimensional medium of clay, these findings document some of the limitations inherent in the transposition of interpretive models derived from the domain of drawing to that of modeling. Our findings suggest that the analysis of representational processes in drawing can benefit from an understanding of its development in modeling. The constraints of the graphic medium can best be understood when we compare a child's performance in two- and three-dimensional media so that we can differentiate between medium-specific and conceptual constraints on the representation. In the two-dimensional graphic medium, animal drawings often display so-called "mixed views," the body drawn in side view, with the frontal view of the head rotated into the same plane as the body. This juxtaposition of different views, most commonly interpreted as a sign of conceptual immaturity, is an exceedingly rare occurrence on our modeling tasks, and calls into question the adequacy of its interpretation in drawing. The study of representational development in both drawing and modeling can provide a more comprehensive account of the principles that underlie the performance in each medium.

Notes

An earlier version of this paper was presented at the Symposiums, M. Kiely, Chair, "The Development of Three-Dimensional Representation" at the Annual Convention of the American Psychological Association, Washington, DC, August 1992.

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1. Distinctions ought to be drawn between the characteristics of the real object and those represented in the clay model. In terms of the latter, a further distinction needs to be made between the spatial dimensions of the modeled object and the pattern it creates in space. A figure composed of stick-like parts, identical in size and shape, might be seen as a one-dimensional object in terms of its constituent parts, while its pattern in space, with all parts arranged in the same plane, would be extended in two dimensions.
2. We wish to thank the children, their parents and the staff of the following schools and childcare centers in Metropolitan Boston for their participation in our study: The University of Massachusetts Daycare Center at the Harbor Campus, The Hollow Reed School in Jamaica Plain, and the Joseph P. Kennedy School in Hyde Park. Above all, we are grateful to the directors, principals and teachers of these institutions for enabling us to conduct our study. We also wish to thank the college students of the University of Massachusetts who participated in our study.
3. The items mentioned in the text present a partial listing of the scale. Requests for scoring criteria should be addressed to the first author.

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A Microethnographic Study of a Novice, Bicultural, Elementary Art Teacher: Context, Competencies, and Concerns

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Abstract

This microethnographic study explores the complicated context, competencies, and concerns of one novice, Navajo, elementary art teacher in a Navajo public school system. Competencies consist of relating Native American symbolism to art lessons; using popular culture heroes as motivation; nurturing class management with figures of speech; reviewing art concepts frequently; developing bilingual vocabulary through word enunciation and voice modulation; giving frequent in-process appraisal; incorporating cooperative participation structures; and utilizing demonstration and imitation, the traditional Navajo modes of teaching. Concerns include the culture teacher's separate program of traditional arts and history; lack of bilingual/bicultural resources and a system-wide curriculum in art; classroom teachers' school art stereotypes; contending Navajo religious end political groups; students' interest in popular culture and gender preferences, lack of time, dwindling instructional resources, alienation, and gender differences in teaching styles.

The purpose of this exploratory microethnographic study is to describe, analyze, and interpret the context, competencies, and concerns of a newly certified female Navajo art teacher in one public Navajo elementary school in northeastern Arizona. Bryant (1974), Kravagna (1971), and Stokrocki (1992–93; 1995) report findings about art teaching in Navajo secondary boarding and community schools, but research on the teaching of elementary art to Navajo children is nonexistent. This study confirms and corrects previous assumptions on Navajo art teaching (Stokrocki, 1992-93) and Standard Native American (SNA) education and compares it with Standard Average European (SAE) elementary art education (Tafoya, 1989). Research is limited to this context and is on-going.

This study covers teaching once a month for an entire school day (6 hours) for 8 months (totally 48 hours). The major questions include: (a) What is the bicultural context of Navajo elementary art education? (b) What are the competencies and problems of a bicultural curriculum? (c) What are the competencies and limitations of competent beginning Navajo art instruction? and (d) What are the students' responses?

Issues in Navajo Bicultural Education

Many people commonly misconstrue bicultural education as foreign language instruction alone. Others define it as cultural separatism in its extreme form (Tomhave, 1992). Some educators argue that more attention be placed on the children and less on the political agenda of community leaders (Porter, 1990). Still others find the development of the children's traditional past and values as well as their new American identity as equally important (Navajo Division of Education, 1989). In regards to the Navajo experience, for example, such an educational view requires bilingual teachers, those trained to read and write Navajo as well as English, to develop new culturally-specific teaching techniques. Deyhle (1986), for example, discovered that Navajo children are not familiar with SAE competition and drive for school success. She also noted that "participant structures, questioning styles, social organization, physical features of classrooms,

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and absence of contextually-relevant materials" were aspects of cultural discontinuity. Some Navajo schools consequently developed a whole language approach (Smith, 1975) to encourage children to learn language by using it to talk, write, and read about what they know (Catrall, Pete, & Fields, 1990). Unfortunately, no resources existed for Navajo language teaching and had to be developed. The Navajo also considered the teaching of facts, processes, and (Navajo) self-worth as important means for establishing a bridge to the SAE world (Cantrall, Pete, & Fields, 1990).

Competent Novice Teaching

Research on teaching generally ignores bicultural teachers' voices and contexts. Educators usually value what expert instructors say about novice teaching (Sabers, Cushing, & Berliner, 1991), but bicultural experts are rare. In a recent survey of important teaching actions for novice teachers, experienced elementary teachers rated highly the ability of beginning teachers to enhance student confidence and self-esteem and to respond to their social and emotional needs (Rosenfeld et al., In press). Although these factors are regarded as important by higher educators, the nature of the complex relationship between competent teaching, the novice level, and bicultural education is virtually unstudied.

Study of the interpretive frames that beginning teachers use to understand and improve their own practice in different contexts seems to be necessary. Buchmann (1987) calls these contextual frames of reference "the folkways of teaching," patterns of action and interpretation that exist, are considered correct, but are mostly uncodified (p. 4). Whereas SAE educators place content-specific pedagogy at the center of teacher understandings, bicultural teachers seem to put their students at the center. Due to the lack of cultural-based information on competent teaching in a specific context, the researcher must weigh findings from several bodies of literature. Often, researchers dwell on educational failures, but need to study minority groups' competencies as well (Chilcott, 1992). Ethnographers in discussion with practitioners can offer suggestions about the complex meaning of competent, beginning, bicultural teaching in context (Reynolds, 1992).

Method

Microethnography is the description, analysis, and interpretation of a slice of everyday life; in this case, a Navajo art teacher in one school. Such qualitative research consists of three stages: (1) data collection, (2) content analysis, (3) and comparative analysis (Wolcott, 1990). The study began with data gathering through daily note-taking, analyzing documents, and informal interviewing. Audio taping was not successful due to the students' soft or inaudible pattern of speaking. As the primary students were shy of foreign adults, a small group of students, chosen by their teacher, became key informants. Time sampling was used to determine the frequency of activities with a stop watch (Barker, 1968).

Content analysis followed. Field notes were transcribed into the computer and sorted data line-by-line into conceptual files with the (tag and dump command) Hyperqual Macintosh program, a version of Hypercard (Padilla, 1993). Initial categories included context, curriculum, and instruction (Bogdan & Biklen, 1992), while the categories of competencies and concerns emerged from a review of the transcripts. Conceptual sub-files, such as types of instruction (substantive, managerial, in-process, nonfunctional) were developed in previous studies (Stokrocki, 1986).

Substantive instruction is the formal teaching of art concepts and skills; appraisal behavior is the process of evaluating student products or processes; managerial behavior consists of distribution, cleanup, and discipline rites; and nonfunctional instruction is teacher behavior not related to the art lesson. The frequent repetition of skills and concepts emerged as an important instructional concept. Comparative analysis is the internal interrelation of concepts and the external comparison with related studies to form tentative insights. Instructor, administrators', researchers', and outside Navajo readers' opinions are included throughout the paper. The goal of this microethnography is understanding from the participants' points of view, not social criticism, and the generation of insights and issues for further study (see Notes 1).

Cultural Context: Navajo Art Education

The Navajo, the largest Indian nation in the United States, consists of nearly 93 thousand people and they live over some nine million acres (The Annual Report of the Arizona Commission of Indian Affairs, 1983). The Navajo refer to themselves as *The Dineh*, the Children of the Holy People, and have for centuries preserved their cultural traditions in spite of their nomadic past and scattered living patterns. Traditional history and arts (weaving, sandpainting, hogan making) were taught at home and in religious ceremonies (Museum of Northern Arizona, 1982). *The Dineh* also exhibited amazing adaptation skills, such as adopting Pueblo weaving techniques, learning silver jewelry making from the Spanish, and incorporating new dyes, added borders, and motives (8 pointed star quilt design) suggested by traders. With their defeat by Kit Carson in the Canyon deChelly and forced walk from Fort Defiance, Arizona to Fort Sumner, New Mexico, the federal government forced children into highly regimented boarding schools and separated them from their families. Boarding school officials discouraged traditional religious practices, and arts, while encouraging agricultural vocations and crafts. Traditional practices are those customs and beliefs passed down through generations of people. The Navajo borrowed some of these traditional arts from others: weaving from their pueblo neighbors and silverwork from the Mexicans (Locke, 1989).

Whereas once the natural richness of the land, the closeness and self-sufficiency of the extended family, and the security of religion made hard times less painful, the rise of the SAE values of competition, grading, and vocational pressure has made families more anxiety-ridden. Unemployment continues to be high, many fathers work off the reservation, mothers have full time jobs, and alcohol and child abuse is on the rise (*Navajo Times*, 1992).

After many years of dominating Navajo education, the federal government developed community schools on the reservation. The Navajo insisted on hiring Navajo culture instructors to teach traditional arts and history at the elementary level. Vocational schools expanded, the Navajo Community College started, and fine arts programs began in junior and senior public high schools. The public school system is under state jurisdiction and federal funding.

Arizona law now requires that visual arts be taught to all students in grades 1–6 by certified elementary art teachers. The major visual arts curriculum components include art in cultural heritage, aesthetic assessment, and creative art expression (Arizona Department of Education, 1988). Local Navajo artists are invited into the schools to demonstrate their talents in painting, pottery, and jewelry. They also instill Navajo pride.

The Running Water school system's philosophy of Navajo education is centered around: (1) promoting students' self-esteem, (2) parent community partnership, (3) Navajo language/culture maintenance, and (4) development of skills to live in a dual society. The elementary principal explained that the school system was returning to SNA traditional values: The arts were to be a center of the curriculum and Navajo language instruction was to begin in fourth grade (4/17/92). In their new mission statement, the art teachers wrote, "The visual arts are a vehicle through which children can learn about their culture and the culture of others . . . build the students' self-esteem and instill a respect for self, family, community, government, and world relationships."

The observed elementary school is a typical, medium-sized, one-story building, built in 1964, and is part of a larger public unified school system, located near the geographic center of the Navajo reservation in northeastern Arizona. Not far from the school is the entrance to one of the picturesque canyon National monuments. The nearby town has become a major tourist site, and the rural community exists on simple dry farming and sheep herding. Most of the land is flat, arid, and overgrazed.

Participants and Atmosphere

The observed instructor, designated as "W," was newly hired and certified in bilingual and art education, which was mostly studio-oriented. She grew up in the neighboring rural town in the mountains. She was educated in a public school in Fort Defiance with little art training and worked as an assistant counselor after high school graduation. Her undergraduate art education specialization is drawing, and she is certified to teach Navajo reading and writing (bicultural education) and English (ESL). Although she usually instructed in English, she translated directions in Navajo for younger, bilingual children. She refers to this school because "Navajo culture is more important here, but a bilingual program is missing."

Students were semi-traditional and of low socioeconomic background. Semi-traditional students speak some Navajo and in school dress in SAE clothes. Their attire includes blue jeans and 'T" and sweat shirts, featuring the latest popular craze, notably the Ninja Turtles. Boys sported baseball caps and girls wore ribboned hairpieces. In contract, students in the southeast area of the State, especially in the boarding schools, are more rural and wear traditional Navajo clothing (Yazzie, 1992).

None of the students had art classes previously. Observations of children and informal interviews with four fourth grade students, as key informants, revealed that the children generally enjoyed art class, found their teacher strict but nice, and learned many things from her.

Findings: Competencies and Concerns

Major findings are frequent and significant concepts, clustered under the preselected categories of school facilities and resources, curriculum, instruction, and students' reactions. The findings are presented first, evidentiary examples follow, and comparative information from similar studies is added.

A. School Facilities and Resources

Facilities were ample with a separate hogan for culture teaching, but art supplies were dwindling. Outside the school is a separate hogan, the traditional eight-sided wood dwelling, in which the culture teacher instructs. At the school entrance, on the wall, is a painting of a large, stepped-diamond design, resembling a Navajo rug weaving. To the left of this entrance is the large art room (30' × 38'). A former storeroom in the older wing converted by W, the art room had a high slanted ceiling and plenty of storage closets and overhead lighting. Make-shift bulletin boards displayed the children's artwork and lesson directions. One display featured children's self-portraits entitled "Smiling Faces at MFES." Above the bulletin board, a color wheel and several value and mixing charts were featured. From the ceiling hung student-made papier-maché hot air balloons and paper cylinder Yeibichai masks (10/25/91). The only physical drawback was a small sink. W considered her facilities ample, desired a kiln, and found her administrators supportive. She received no instructional resources nor help from other art teachers in the school system. Near the end of the year, she began running out of supplies. As materials needed replacing, she purchased them with her own money.

B. Curriculum

School art heritage was conditioned by classroom teachers. In this school, art was formerly taught by classroom teachers, of whom approximately 50% were Navajo, and consisted mostly of holiday "cut and paste" activities as well as mimeo pictures to color. W introduced such holiday-related lessons as skeleton drawing, plaster of paris face masks, and Thanksgiving turkey assemblage, at the request of her students. When questioned further about this attraction, W mentioned that the holidays were fun for the children and the teachers as well. Efland (1976) notes the persistence of such conditioned school art tendencies—popular seasonal topics and handicraft activities—throughout the history of art education. SAE children also expect to make such holiday images as Halloween ghosts, pumpkins, and witches, as early as September (Stokrocki, 1986).

A Navajo culture teacher taught Navajo cultural heritage and art forms. No bicultural curriculum nor art instructional materials existed in the school. Observations of the noncertified culture teacher in the hogan outside of the school revealed lessons on Navajo tapestry weaving, model hogan building out of popsicle sticks, and coil basketry made of yucca leaves. Students as young as five years, for example, were expected to know the five steps in rug making and the symbols of the Navajo nation seal.

W also introduced Navajo culture in art lessons. W introduced the culture appreciation of insects and their functions in a paper cutting/forming lesson (Stokrocki, 1993b), comparing SNA and SAE foods in a clay lesson (Stokrocki, 1994), and tribal costume design and patterns in a drawing lesson. In one sixth grade class, children also explored SNA symbols. She directed students to find SNA symbols in the library, to draw and rearrange them into a balanced design (symmetrical or asymmetrical), and to repeat colors with acrylic paint. W's teaching featured respect for nature, self, family, school, community, and nation in addition to the gradual acquisition of art skills and concepts.

Differences in religious beliefs curtailed teaching of Navajo symbols. When W was first hired, she shared ideas and planned lessons on symbolism with the culture teacher. Conflict arose over different philosophies in regard to creation and evolution myths. W insists that children must learn who they are and have a good foundation in harmony with the school district's policy. W introduced symbols from the Northwest coast tribes as well. Now, they don't integrate teaching. Art teachers met and compromised that the teaching of American Indian art history and symbols in general would not offend different Navajo religious groups (Catholic, Protestant, Mormon). The political situation, however, is changing so fast on the Navajo reservation, due to influences of The American Indian Movement and the Native American Church.

W tolerated and motivated the study of SAE art appreciation through popular art influences. In response to her students' fascination with the Ninja Turtles, she allowed them to make clay imitations while learning to build up clay shapes through scoring. SAE art teachers also introduce art appreciation through similar popular culture "hooks" (Bullock & Galbraith, 1992). Alexander (1983) speculated that young children are attracted to exotic, foreign, and mysterious forms and that stereotyped imaging is a necessary phase of growing to understand the cultural world, full of ideological stereotypes. SAE teachers "allow for the diverse interests and abilities of their children and grasp the opportune moment to present a new concept, an enriching experience, or a new unit to their students" (Stokrocki, 1986 p. 85).

Fine art appreciation began with her students' popular culture interests. Since this was a new art program, SAE art appreciation and history resources were not readily available. W informed me that she traveled four hours into the city to find books for her students. As many SAE culture art teachers have experienced, W's first art appreciation lesson flowed naturally from students' popular interest in the Ninja Turtles. She showed students pictures of the actual artists as old men and examples of Leonardo's inventions and art works in a popular pop up book (Provenson, 1984). She also read them a short story on Michelangelo (Barker, 1987). Students were amazed at the size of the figures in Michelangelo's *Sistine Ceiling* and did a sketch of one of the figures. She later admitted that she needed to learn more about the role of art in different cultures. Since her training was predominantly studio-based, she felt that her art history background was weak and that she needed to explore different formats (see Notes 2).

Drawing, crafts, and basic art elements were dominant components of the elementary art curriculum: During her first year, W heavily relied on activities from Herberholtz and Hanson (1974/85) involving drawing, tearing, cutting/pasting shapes, experimenting with colors, and modeling/shaping/constructing. Concepts frequently reviewed included value, rhythmic lines, shapes, three-dimensional, texture, and primary/secondary color, and collage. Exemplar activities at the upper elementary level included: a drawing unit consisting of shading a feather and a sketching a still life, skeleton copy completion with imaginative dress and setting, one-point perspective, watercolor painting, and enlarged grid drawing for upper elementary students. Craft projects were periodically inserted, such as constructing papier-maché hot air balloons, plaster strip masks, and clay animals.

Lower elementary classes started with drawing and cutting/pasting skills, experimented with mixing colors, and ended with clay and puppetry. When questioned about her dominant use of art elements, she defended her position, saying, "Navajo students need to learn English vocabulary and to become more broadly aware, even though Navajo design sense is more [Navajo] culturally-conditioned."

C. Instruction

Time restraints were a major concern. W's rotating schedule consisted of three, 30-minute, primary classes; four, 45-minute, upper elementary classes, and lunch/playground duty. As most novice teachers experience, limited art time (30 minutes at the K-2 level) made it difficult for her to occasionally manage art projects. W and her students complained about lack of time. Such narrow time restraints are the major concerns of SAE elementary art teachers as well (Stokrocki, 1986).

During one lesson on constructing paper turkeys, for instance, W explained, "The children asked to make the turkeys for Thanksgiving and I wanted them to have a 3-D experience. It was probably too hard for the kindergartners. We have so little time and few resources. The first graders did well and finished in their classroom." In another lesson on papier-maché hot air balloons, she finally confessed, "I got tired of them; they're messy, [the project] was too long, and [the glue texture] was coming out bumpy. Students can come in during their free time to finish them" (11/22/92). Later, she confessed that she was not trained to teach this age level and needed suggestions.

Competent management consisted of strict class organizational skills, a gender difference in teaching style. In an initial, informal interview, W mentioned her strong points as organization and discipline. These observations were supported by her principal. Her managerial behaviors were fairly consistent at the upper elementary level (8 minutes or 18% frequency, see Table 1). Students also signed a written contract (posted on the wall) of class rules. Her strict distribution and cleanup rites consisted of using student captains, having students line up quietly at the sink, and providing specific procedures. Only one disciplinary infraction occurred; when students were told to remove their gum (11/22/91). SAE competent elementary art teachers also have strict distribution, cleanup, and discipline rites because of their short time schedule (only 30-40 minutes) with each class (Stokrocki, 1986).

In comparison to previously studied, male art teachers, both SNA and SAE, on the Navajo reservation, she seemed stricter. Males at novice levels may tend to be more playful and laissez-faire with their students (Hawke, 1980). The women are the first teachers and the disciplinarians in Navajo matriarchal-based culture (Leighton & Kluckhohn, 1947). W also received little help from male art teachers in the school system and felt alienated. Several times during the year, W hinted of her loneliness. On weekends, she often left the area to return home, which she missed, an hour away. [For other issues of authenticity, authority, cultural dynamics, representation, and negotiation, see Stokrocki, 1994.]

W's teaching style was highly nurturing and motivating through delightful figures of speech. W believed that she was well trained in education, and she valued her experience as a counselor. She stated, "I know my students thinking process and their bilingual translation." W was very polite to her students and addressed them as a class: "Boys and girls. . . ." She often praised the class and asked them to clap for each other for a job well-done. W reflected, "I understand them and encourage them to explore who they are."

W also used simile to motivate students. Simile is that figure of speech where dissimilar things are compared. Frequently, she directed her students, for example, to walk quietly "like a cat" or to sit on the floor "like a pretzel" (Videotape, 5/16/92). Such appealing visual figures seem positive ways to inspire bicultural children.

W frequently demonstrated and reviewed a new process. During one clay modeling lesson of their choice of animal with fourth graders, she explained specific steps written on the board: clay base (1/4" thick), three levels, score, smooth parts, add texture. Later, she reviewed procedures using a student example, "John wants to make a horse. The legs need to be thicker here." She further inquired, "How do you do that?" One student answered, "Wet the clay, make scratches, add some more clay [slip], and smooth it." W then modeled how to make the horse's legs stronger by building up the clay legs. She then quizzed them, "What process is this called?" "Scoring," students mumbled. She reminded students not to use too much water and to remember to add texture. At the end of the lesson, she reviewed the sequence once more, "What do I want to see?" Students answered in chorus: "Scoring," "three levels," and "texture." Demonstration and repetition are the dominant traditional modes of teaching Navajo children (Kluckhohn & Leighton, 1962). [Average substantive instruction is 20%; see Table 1. Substantive instruction is the formal presentation of new information or its review with the entire class.]

Oral instruction through word enunciation and voice modulation. Usually W's verbal emphasis was at the beginning of the word, which trailed off in a sound.

Table 1. A Time Sampling of W's Upper Elementary Art Instruction

Session	Substantive min.	Managerial min.	Appraisal min.	Nonfunctional min.	Total min.
10/25/92	10	10	23	2	45
11/22/92	9	9	22	5	45
12/13/92	7	7	23	7	45
1/23/92	7	8	22	8	45
2/92	no visitation—flooding				
3/17/92	6	9	27	3	45
4/10/92	17	8	20	0	45
5/16/92	5	5	18	17	45
Average	9 min. 29%	8 min. 18%	22 min. 48%	6 min. 13%	45 min. 100%
*W's Lower Elementary Art Instruction					
4/10/92	7	7	15	1	30
5/16/92	15	5	5	5	30
Average	11 min. 37%	6 min. 20%	10 min. 33%	3 min. 10%	30 min. 100%

* [Observations at this level discontinued because teacher felt uncomfortable teaching kindergarten due to lack of training]

The word "Yesssss," for example, begins hard and ends in a soft "sissing." At other times, it seemed like a word, such as "hard" was given a double extension "har-ard" W circulated the room with such musical intonations. She whispered, "Draw me a so-oft li—ine—nnn." Yazzie (1992) also pointed out the power of such repetitive sounds, "In traditional Navajo culture, learning occurs orally. Use handouts, written worksheets, posters of all varieties, and short vocabulary tests to repeat the concepts with Navajo children." Art skills and concepts may be remembered through repetitive chants, a major mode of religious instruction (Stokrocki & Yazzie, 1993a).

Constant flash appraisal was important in building students' confidence. W also used flash appraisals. For example, she would often praise with options, "I like that [yarn] hair on your mask. How will you style it? Hanging or with braids?" With her bilingual students, she repeated directions in Navajo; for example, when they didn't understand the concept of "zigzag," for which no Navajo word exists, she repeatedly scratched the line in clay. Amiotee (1982), Native American art teacher, explains that educators need to understand the standpoint of the students at the level from which they come and that teachers must also grow with their students.

In-process appraisal was dominant. W mostly instructed informally through in-process appraisal (48%; see Table 1). In process appraisal is the informal monitoring and guiding of students' process and product. For instance, during the clay modeling lesson, a fourth grader wanted to know how to make a clay bird. W inquired, "How do you want it to look—with feathers, flying? Sketch it out first." Later, W demonstrated a small model, "Pinch [the clay] like this. Add feathers [scrape them into the clay] and pull out a beak." She then circulated the class with a student example of a clay dog, "Not too big or skinny. Start building from the base [bottom up]. Read the directions on the board" (11/22/91). In comparison, the SAE male art teachers on the reservation would give out materials and let the children work freely with no guidance nor review of concepts.

Erickson and Mohatt (1982/1988) first videotaped and studied communication differences in SNA and SAE teachers. They noticed that SNA teachers spent most of their time circulating the room and giving individual attention and that in time the SAE teachers began to do the same when teaching SNA students. Another difference between SAE and SNA teaching is that SAE children are more independent learners and do not demand attention (LaPointe, 1980).

Cooperative learning was a dominant participant structure. W occasionally used her students as demonstrators. During another lesson on two-point perspective at the sixth grade level, W handed a yard stick over to a boy and asked him to review the procedure on the chalkboard. As she orally directed each step, he drew in each line. Students helped each other when drawing the lines in perspective at their seats as well. On another occasion, she encouraged her students to work in teams to make plaster of paris masks. One student worked on the face, while the other modeled and a few others watched. Furthermore, her male students watched and helped each other draw horses for long time periods. Cooperation was reinforced many times in other lessons and other levels (12/13/92, 5/16/92). Such peer teaching strategies are widely accepted by the Navajo, who are excellent mimics (Leighton & Kluckhohn, 1947).

D. Student Reactions

Students seemed to enjoy mask and claymaking. Informal interviews with fourth grade key informants at the beginning of the year revealed their preference for making (plaster-wrap) masks (10/25/92). These same students also valued working with clay at the end of the year, but multiple observations revealed that all student levels highly enjoyed clay. Horses, dogs, dinosaurs, whales were frequent subjects for boys, while girls tended to make bears, shoes, ice cream cones, and hearts. Even her first graders enjoyed making "wiggly animals" (lobsters, snails, snakes) out of clay (Stokrocki, 1994).

Gender differences problematic: Drawing for males at any time was never a problem. During free drawing times, boys frequently drew horses, trucks, and comics from "how to draw" books. Navajo males tend to be better draftsmen (sandpainting) and informally compete among themselves (Fields, 1992). At the high school level, more males elect art, especially drawing, than females (Stokrocki, 1992–93; 1995). All students seemed to like working with pastels and making symmetrical designs.

W told me that some of her female students seemed to avoid complex drawing. Early in the year, W gave them half a drawn skeleton model in which to complete the other side and then to draw on clothes. W reflected, "My girls told me that their moms don't want them to draw skeletons—it's taboo. Sometimes, I think the girls are trying to get out of work." W called their mothers to check on their excuse and to inform parents that the drawing was for Halloween and learning about the structure of the body. I also noticed that the sixth grade girls at times fussed over one object, waited for help, and generally stalled when drawing a still life, even after W assisted them.

Navajo female students have traditionally been educated by their grandmothers to weave, which was more craft-oriented (Anderson, 1990). Whitesinger, a Navajo art teacher, informs, "Girls are not used to praise in school, whereas boys get public praise in the community. I work with girls individually to inspire them to work on the level of the boys" (6/11/92). This tendency is changing due to the introduction of non-sex related arts at an early age.

Students seemed to enjoy reacting publicly to their artworks in class: In the past, public individual praise was reportedly not part of traditional Navajo ways. This cultural practice, however, is changing. Praise for the accomplishments of an entire class was frequent. Children now are encouraged to speak up and not to be shy at an early age. Whitesinger, a Navajo art teacher (1992) proposed, "Navajo students need to learn to be bold and articulate, in order to survive in the SAE world. In this way, people will learn to respect their opinions."

While older Navajo students may be more reticent, younger ones seem more eager. This finding contradicted earlier research: (a) Navajo students do not like to recite publicly (Stokrocki, 1995); (b) be placed in competitive situations with classmates (Wax, Wax, & Dumont, 1964/89); (c) are sensitive to shame—giving incorrect answers—(Kluckhohn & Leighton, 1962); and (d) the teacher should not question students as a switchboard operator, one who directs turn-taking (Erickson & Mohatt, 1982/88). Such findings show a differential age gap in participation structures between high school and elementary students.

Conclusions and Recommendations

This microethnographic study describes the complicated context of bicultural art teaching in a public Navajo school and discloses the competencies and concerns of one beginning teacher. The study also unveils a collage of confusing (Bryant, 1974) and competing influences, continually negotiated in the dynamic context of tribal, pan-Indian, and SAE culture experiences (Clifford, 1988).

Instructional competencies consist of relating Navajo and other SNA tribal culture symbolism to art lessons; using popular culture heroes as motivation to introduce SAE art appreciation; nurturing class management with delightful figures of speech; reviewing lesson steps and art elements and principles frequently; developing bilingual vocabulary through word enunciation and voice modulation; giving feedback through frequent in-process appraisal; incorporating cooperative participation structures; and utilizing demonstration and imitation, the traditional Navajo modes of teaching. Emphasis on such instructional competencies may seem ordinary to some, but such instruction is significant for bilingual language acquisition, but the traditional patterns of Navajo instruction are changing.

Concerns include the following competing influences: the culture teacher's separate program for teaching traditional arts and history; lack of bilingual-bicultural resources, art program, and system-wide curriculum in art; classroom teachers' conditioned school art stereotypes; the external pressure of contending Navajo religious and political groups; students' interest in popular culture and gender preferences in art tasks, feeling uncomfortable about teaching art history and being unprepared to teach kindergarteners, lack of time, dwindling instructional resources, alienation, and gender differences in teaching styles. Whereas SAE male narrations are more crisis-oriented, female SNA stories are more concerned with repetitive daily activities and preserving culture in bridging different cultural learning systems (see Notes 3).

Notes

This article is an interpretation, is limited to this context, and represents on-going research. In this case, truth-telling and justice may be more fitting criteria than traditional scientific categories, such as objectivity. In pursuing justice, a researcher must avoid exploitation and misrepresentation, continue to support participants, and to seek other viewpoints.

1. This study was supported by an Arizona State University Arts, Social Sciences, and Humanities Grant.

2. When I visited W during her second year of teaching, she admitted that she felt more confident and found more resources and instructional ideas, because of her participation in the Getty Institute on Multicultural Education in Austin, Texas during the summer of 1992.

3. Bataille & Sands (1984) argue for more understanding and tolerance of female au-

thority, narration styles, and gender roles. Furthermore, Thompson (1986) discovered that SNA women relate better to female researchers in regard to child training patterns and school performance.

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A Cross-Cultural Assessment of the Maitland Graves Design Judgment Test Using U.S. and Nigerian Subjects

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Abstract

Presently there is no acceptable visual art test instrument. Existing tests have failed to live up to claims made by their authors. Although researchers have identified the inadequacies of these tests, no one has conducted a detailed empirical study to ascertain what the tests actually measure, and no one has systematically measured the consistency of subjects' responses across cultures.

This study offers a partial remedy to this situation by assessing the efficacy of the Maitland Graves Design Judgment Test (1946, 1948) in a cross-cultural setting. Specifically, 1,026 high school and college subjects representing art trained and non-art trained backgrounds from the United States (US) and Nigeria participated in this study. Although the main results confirm earlier studies that showed that the test was inadequate in measuring aesthetic judgment as defined by Graves, this study supports Graves's claim that art groups consistently scored higher than non-art groups. The results also suggest that because the US subjects' scores for both the art and non-art groups were higher than the Nigerian scores, the test has limited use in a cross-cultural setting. More important, the results reveal that subjects from the two cultures did respond consistently to three factors: symmetry, three-dimensionality, and complex design.

The quintessence of this paper is the assessment of the Maitland Graves Design Judgment Test (1946, 1948), using US and Nigerian subjects, for the purpose of identifying design items for inclusion in an art test. Cross-cultural studies of this sort are a crucial aspect of the arts today because psychologists and art educators have become increasingly aware of the need to assess cultural issues when testing students from a variety of ethnic backgrounds (Winner, 1982; Ross, 1986; Liu, 1990; Hardiman, Liu, & Zernich, 1992).

To date, attempts by scholars in the arts and in psychology to construct an acceptable visual art testing instrument have been largely unsuccessful (Hardiman & Zernich, 1975; Hardiman, Liu, & Zernich, 1992; Eysenck, 1967). There are two aspects to this problem: (a) the nature of art itself; and (b) finding acceptable definitions for art terms used in the tests. The subjective or objective nature of art is the fundamental issue which continues to produce problems for art-test validity and reliability. The problem is further complicated by the application of differing definitions to art terms in the construction of art tests (Hardiman & Zernich, 1975). The understanding of many art terms that are basic to judgmental tasks, such as "aesthetic," "preference," and "expression" remain unclear or, as in the case of Child's (1964) opinion, changes over time.

Although, the question of an acceptable, objective measurement of content validity in visual arts tests remains open, few insights have been offered toward finding objective criteria for art test construction. Brumbach (1981) suggested that answers may be sought by investigating what it is that existing art tests actually measure. Crocker and Algina (1986) suggested among other guidelines the identification and investigation of the test score primary uses. Some art tests that are open to such investigation include the Maitland Graves Design Judgment Test (1946, 1948), which is the focus of this paper; the Meier Art Tests, versions I and II (1929, 1940); the Knauber Art Vocabulary Test (1932); and the Horn Art Aptitude Inventory (1944).

The Graves test is a typical example of an art test having several reviews that

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are short of detailed information. It was rejected by reviewers for lack of evidence of validity (because the author's theoretical assumption was unfortunately affected by changes in individual views of aesthetic values) and for lack of balanced items in the test (Eysenck, 1967; Eysenck & Castle, 1971; Liu, 1990).

While the reviewers may be correct in their observation that the Graves test lacks validity, Eysenck (1967) and Eysenck and Castle (1971) also did not present in detail what the Graves test actually measures. Such information would have provided more understanding of the nature of the test. The purpose of this article is therefore twofold: to reexamine the Graves test in terms of what it actually measures, and to assess its suitability for testing across cultures.

The first hypothesis is that the Graves test does measure consistent design items among subjects. The second hypothesis is that the consistency of subjects' mean score performance on the design items is similar among subjects used in this study. The objective of this study is to assess the possible strengths of the Graves test in a cross-cultural setting in order to: (1) Find out which design items are actually responded to in a cross-cultural setting, and (2) measure the level and consistency of subjects' performance.

Method

Subjects

A total of 1,026 subjects from the United States and Nigeria participated in this study. N = 516 US students (240 art, 276 non-art), and 510 Nigerian students (275 art, 235 non-art). The subjects from both cultures were mainly from the medium- and high-income family backgrounds.

Instrument

The Maitland Graves Design Judgment Test is a self-administering test designed to be used for grades 7–16, as well as adult populations (Graves 1948; O'Hare, 1984; Liu, 1990). The test, as claimed by the author, discriminates between the perceptual and judgmental abilities of artists and non-artists. It also measures the degree to which subjects perceive and respond to eight fundamental principles of aesthetic order: unity, dominance, variety, balance, continuity, symmetry, proportion, and rhythm. The test consists of 90 sets of two or three non-representational designs. The first 79 items are two-dimensional, and the last 11 items are three-dimensional. The test, normally presented in booklet form, was reproduced on professional-quality color film slides for this study.

Evidence of validity was estimated by a comparison of the mean scores of art and non-art students with the main scores from the original Graves test. The art subjects' mean scores from both educational levels suggested that they would perform better on the test than the non-art subjects.

Internal consistency and reliability was given for the 14 groups used in the standardization. The split-half correlation coefficient, using the Spearman Brown formula, produced .81 and .93 (n = 36–246 for each group, N = 1,306). Standard errors of the measurement (sem) were sem = 2.88–3.90 (Graves, 1948).

Procedure

The procedure for the administration of the test was the same at every location in Nigeria and the United States. Differences were only in terms of the rooms, assistants, and dates. At each location, a dark room with a white screen or wall was used to display the slides. In most cases subjects were in groups of 5 to 20. At each location the test started by introducing the subjects to the study, then written instructions were both given and read to them. Subjects were told that they would view groups of designs either two or three at a time. They were told to look at each slide and decide which of the designs they preferred. They were also told that although some of the designs may seem to have equal appeal, they were expected to try in each case to make a single choice. The self-timed slide projector was adjusted for 5-second intervals, within which subjects viewed and responded to each slide by choosing from each set. At the end of the test, subjects were debriefed.

Statistical Analysis

All answers were computed, using two statistical analysis programs: (a) principal component analysis, and (b) principal factor analysis. Statistical analysis of the data includes a computed principal component analysis and a factor analysis, in order to identify factors in the Graves test that seem to suggest response to aesthetic design. The principal component analysis involves a historical comparison of past and present statistical findings on the Graves test; the past being the Eysenck (1967) study and the present being my study of 1993. Principal factor analysis is used for the main analysis in this article. There is also a computed statistical study on mean scores of subjects based on culture by culture and culture by training.

Results

The results of this study are derived from two analytic assessments. The first assessment involved a principal component analysis of the mean scores of Eysenck's (1967) group and the US and Nigerian groups from this current (1993) study.

Principal Component Analysis

Eysenck (1967) administered the 90 items of the Graves test to 172 male industrial apprentices of 16 to 18 years of age. Matrix inter-correlation on those scores were factor analyzed using the principal component method. The first five factors (which were common to subjects in both Eysenck's and the present study) were rotated to an oblique simple structure by means of promax. These factors are: Symmetry, Three-Dimensional, Complex, Less-complex, and those allowing no interpretation (see Table 1).

Out of these five factors identified as common to subjects in both studies. The first four were interpretable. Symmetrical and three-dimensional items are clearly represented among the three subject groups, with symmetrical design items being the most strongly represented. Eysenck's group responded to 11 three-dimensional items, while the US and Nigerian groups responded to three items each. All groups responded to four similar complex factor items and in the less-complex factor one item was common in all groups.

Further interpretation beyond the data presented cannot be made in this present analysis, because the raw scores of Eysenck's data were not available for statistical computation. However, a more comprehensive factor analysis, which establishes a connection with Eysenck's study, was carried out using the US and Nigerian subjects only. This was based on analyzing all design factors that were common to both groups.

Principal Factor Analysis

The second assessment involved a two-part factor analysis: (a) principal factor analysis of the mean performance scores of the design item variables common to both the US and Nigerian cultures and (b) analysis of the mean scores of common factor variables from both cultures. The factor analysis of the mean performance scores was carried out at a minimum of .50 varimax with three factor numbers. For better interpretation of the output print,

Table 1. Factor Loading of the Principal Component Analysis of Three Different Groups of Subjects (Corr. = .50)

Common Factors														
1			2			3			4			5		
Symmetry			3D			Complex			Less-complex			No Inter.*		
EY	US	NI	EY	US	NI	EY	US	NI	EY	US	NI	EY	US	NI
21	21	21	87	87	87	1	1	1	54	54	54	77	77	77
50	50	50	84	—	84	40	40	40	18	18	—	6	58	—
51	51	51	85	—	85	55	55	55	30	30	—	7	76	—
57	57	57	88	88	—	74	74	74	8	—	—	11	—	—
59	59	59	89	89	—	12	—	—	21	—	—	33	—	—
61	61	61	80	—	—	26	—	—	25	—	—	36	—	—
69	69	69	81	—	—				27	—	—	45	—	—
—	6	6	82	—	—				32	—	—	88	—	—
—	22	22	83	—	—				42	—	—	89	—	—
—	37	37	86	—	—				44	—	—			
—	67	67	90	—	—				47	—	—			
29	29	—							51	—	—			
48	48	—							—	—	52			
8	—	—							66	—	—			
—	—	16							78	—	—			
28	—	—							79	—	—			
—	—	33												
—	—	40												
47	—	—												
—	53	—												
—	—	65												
—	—	66												
72	—	—												

EY = Eysenck's, US = United States, NI = Nigerian.

* No interpretation.

Note: Order of the factor does not necessarily reflect order of variance explained. Items of similarity and difference are ordered in groups by number of common items according to group items allowed in marked order on the test.

the statistical analysis is presented according to similarities and differences in factor loading (see Table 2).

Factors Common to the US and Nigerian Cultures

Symmetry: Both the US and Nigerian groups show similar responses to ten pairs of two-dimensional, black-and-white designs, most of which are composed of simple lines arranged either symmetrically or asymmetrically (see Table 2, column 1). (The adjective "simple" describes the general nature of the design elements; that is, thin, parallel, straight, or wavy lines.) Differences common to the US and Nigerian groups occurred in the areas of size, color, general appearance, nature of design, and elements of design.

Three-Dimensionality. The US and the Nigerian groups showed common responses to three large black, white, and gray three-dimensional designs. No differences were recorded due to low factor scores in the numbers that were different.

Complexity: Both groups responded to a similar pair of complex, 2-dimensional, black-and-gray designs on a white picture plane. Differences in complexity items have both groups responding to similar items in terms of size and central, frontal placement on the picture plane; color; and general shapes of the design elements, as well as the use off black-and-white values. The US group preferred a regular design, however, and the Nigerian group preferred an irregular design.

Mean Scores of Common Factor Variables

In order to examine the hypothesis that the consistency of subjects' mean score performance on the design items is similar among subjects used in this study, the factor variables of symmetry, complexity, and three-dimensionality that have been identified from the computation of the factor analytic study, were analyzed as follows: Common factor variables were computed to have mean scores. Each value of a response to set design item was weighted one (1) for the correct answer and zero (0) for a missed number. All computations were based on the correlation of .50.

The mean scores of factors common to the US and Nigerian groups on the Graves test are presented in Tables 3, 4.

In Table 3 the mean score performance of the US group is generally higher than the Nigerian group. The US subjects scored higher in both similarities and differences. The Nigerians scored higher only in the similar complex design item variable. In Table 4, the mean scores for the art group for each culture were consistently higher than the scores of the non-art groups.

Discussion

Results from this study were contrary to the research objectives originally stated. However, these data do offer insights to the problem of formulating an acceptable art test instrument that could be used in both a single culture and for a cross-cultural setting.

Overall, however, the art groups had higher mean score performances than the non-art groups. The difference suggests a consistency in performance to the advantage of training in responding to the design items.

The analysis does not support the hypothesis that the consistency of subjects' mean score performance on the design items is similar among subjects used in this study. However, the analysis did reveal some consistency. The US group did have higher scores as presented in Tables 3 and 4; also the art groups did score higher than the non-art groups as seen in Table 4. This indicates that training has an advantage over non-training.

While some discriminatory power of the Graves test can be claimed (the art groups from both cultures consistently performed higher than the non-art groups), its accuracy in a cross-cultural setting is questionable. The US art and non-art groups performed higher than their Nigerian counterparts, which indicates that in its present form, the Graves test was not appropriate for cross-cultural study. And since the test measured only three factorial design items out of the eight originally claimed, the test cannot even be said to be reliable in measuring aesthetic order in the US culture, let alone other cultural settings. However, other implications and interpretations are possible.

In contrast to Eysenck (1967) and Eysenck and Castle (1971), the present study addressed the issue of consistency of design factors and confirmed the potential value of art tests. This present study revealed that there are three factorial design items from the Graves test that are responded to consistently in both the US and Nigerian cultures: symmetry, three-dimensionality, and complexity.

Additionally, the Eysenck (1967) and Eysenck and Castle (1971) studies did not provide a full description of the design elements responded to by their US subjects. In the present study, both the US and Nigerian subjects showed similar responses to symmetrical designs made

Table 2. Factor Loadings of the Principal Factor Analysis of Two Scores From US and Nigerian Subjects (Corr. range = .50 & 60)

Common Factors											
1 Symmetry				2 3D				3 Complex			
US		NI		US		NI		US		NI	
8.92		7.69		3.32		2.77		3.01		3.63	
58.4%		54.6%		21.8%		19.7%		19.7%		25.8%	
Similarities simple lined				Similarities comprehensive				Similarities 3-color			
#	Corr.	#	Corr.	#	Corr.	#	Corr.	#	Corr.	#	Corr.
29	.6	29	.5	77	.5	77	.5	40	.6	40	.5
44	.5	44	.5	88	.5	88	.5				
48	.5	48	.6	89	.5	89	.5				
50	.6	50	.6								
51	.6	51	.5								
57	.5	57	.5								
59	.7	59	.6								
61	.6	61	.6								
66	.6	66	.6								
69	.6	69	.6								
Differences				No differences				Differences			
Comprehensive		Simple						Regular 3-Color		Irregular B & W	
8	.5	—	—					1	.5	—	—
—	—	21	.5					—	—	26	.5
25	.5	—	—					55	.6	—	—
—	—	37	.5								
42	.5	—	—								
—	—	67	.5								
47	.5	—	—								
53	.5	—	—								
65	.5	—	—								
Final Commonality Estimates Total											
US						Nigeria					
15.25						14.09					

Note: Labels in order of similarity and differences are explained in the text.

up of simple lined forms. In the design items that showed differences, the US subjects responded to comprehensive designs while the Nigerians responded to simple designs. For the 3-dimensional factor, both cultures responded to comprehensive design items. Lastly, for the complex design factor, the item that both cultures responded to differently was a three-colored item. The design items that both cultures responded similarly to was a regular, three-colored design for the US respondents and an irregular, black-and-white design for the Nigerians.

In the present study the mean scores of common factor variables by culture, and culture by training, supplement the information provided by Eysenck (1967) and Eysenck and Castle (1971). These results reveal that the differences of response remained consistent even when all variables were used. However, in the

Table 3. Mean and Standard Deviation Scores of Common Factor Variables by Culture

Factor		US	Nigerian
		Similarity	
Symmetry:	X	.55	.34
	SD	.33	.29
3D:	X	.44	.30
	SD	.36	.33
Complex:	X	.61	.78
	SD	.49	.41
		Differences	
Symmetry:	X	.66	.31
	SD	.29	.33
Complex:	X	.58	.56
	SD	.49	.50

n = 516 US subjects, 510 Nigerians.

culture variable, while the US subjects consistently scored higher than the Nigerians in the symmetrical and three-dimensional factors, the Nigerians scored higher than the US subjects in the complex factor. This suggests that while cultural backgrounds were a factor in subjects' responses to the design items, the complex design item factor remains the only one in which the Nigerians scored higher than the US.

The practical implication is that symmetrical, three dimensional, and complex design elements could be incorporated in a test instrument for use in any study. It also means that each factor can be expanded by including more variables from each culture. A factor such as symmetry can also be studied in terms of various aspects of test presentation.

It is obvious that further research is needed in the areas of internal and external validity of symmetrical, three-dimensional, and complex design items, as well as the methodology of design and usage. The issue of cultural bias should also be taken into consideration in the construction of art tests. Whether the test is to be used in a single culture or cross-cultural study, emphasis should be placed on making sure that the first stages of research into the art test instrument is carried out by a joint body of experts from each culture involved. The objectives of the art test should also be very specific and expectations should be based on those objectives. Pilot studies should be carried out in various cultural settings before a final selection of the test items is made. Differences in results should be investigated to isolate influencing variables. The final test instrument should also be subject to periodic review.

My speculations from this present study

Table 4. Mean and Standard Deviation Scores of Common Factor Variables by Culture by Training

		US		Nigerian	
Factor		Art	Non-Art	Art	Non-Art
			Similarities		
Symmetry:	X	.68	.43	.37	.31
	SD	.30	.30	.31	.26
3D:	X	.49	.40	.32	.29
	SD	.36	.35	.34	.32
Complex:	X	.71	.53	.82	.75
	SD	.45	.50	.39	.44
			Differences		
Symmetry:	X	.77	.57	.33	.29
	SD	.24	.29	.34	.31
Complex:	X	.68	.50	.67	.43
	SD	.47	.50	.47	.50

n = 240 US Art, 276 Non-Art; 275 Nigerian Art, 235 Non-Art.

(subject to further empirical study) are that: (a) The similar responses to the three design factors of symmetry, three-dimensionality, and complexity may arise from similar methods of formal education in the classrooms of both cultures. (b) However, the US subjects may be more responsive to symmetrical and three-dimensional design elements than the Nigerian subjects because of the simplified (or basically more stable) societal structure of the United States; (c) on the other hand, the Nigerian subjects may be more responsive to complex design elements than the US subjects because of the more complex, and still developing, societal structure of Nigeria.

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When a Photograph Is Judged Artistic: The Influence of Novelty and Affect

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Abstract

This research concerns the manner in which novelty of the pose and affect of facial expression determine subjects' ratings of the artistic merit of photographic material. Undergraduates were shown a series of person photography that systematically differed along quantifiable dimensions of novelty and affect, and were asked to judge the degree to which each photograph exhibited "qualities of good art and good photography." The data show a substantial correspondence, yet interesting discrepancies, between the two ratings. They suggest that while, in general, the same underlying dimensions and processes are used to determine judgments of artistic and photographic merit, different levels of novelty and affect may be factors that determine when a photograph is considered artistic and when it is not.

In our previous study (Marshall & Thornhill, 1991) we assessed the influence of novelty of the pose and the affect of facial expression of photographic stimuli on photographers' decisions to shoot or not to shoot a photograph. Subjects were shown a series of photographs (in slide form) and, via a hand-held button, activated a mock studio flash if they would have taken that photograph, and another button if they would not have taken that photograph. Subjects performed this task under instructions to shoot what they thought were good photographs. We concluded that professionals were more selective than amateurs, that subjects were more likely to shoot poses of moderate novelty, that the probability of taking a photograph was an increasing function of positive affect, and that the latency of the decision not to take a photograph decreased with increasing negative affect.

In this study we were curious about how novelty of the pose and the affect of facial expression influence judgments of *artistic* quality. This would yield more than just a simple determination of the influence of two, out of many, stimuli. By comparing artistic evaluations with photographic evaluations we also would be able to determine the extent to which these two evaluative responses *covary.* Substantial covariation would suggest that similar fundamental dimensions and operations were being used in determining both evaluations. That is, within the confines and variables explored in this study, the factors subjects use to determine that a picture is good photographically may also be used to determine that it is good artistically. Conversely, differences in the functions of these variables would suggest differences in the operation of underlying processes. Although the question of whether photography is art has for all practical considerations been resolved (Brunnell, 1981) by the recognition that photography is a medium like any other that may (or may not) be used in artistic pursuits, we thought this an interesting opportunity for an empirical analysis of a more meaningful question: when does a photograph become artistic?

Method

Subjects

The subjects in this study were a total of 60 undergraduate men and women who volunteered to participate for extra course credit.

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Materials

The subjects viewed a set of photographs used in one of our earlier studies (Marshall & Thornhill, 1991). Briefly, all of the photographs (actually slides) were of the same female actress in different poses that represented different degrees of novelty of pose and affect of response (facial expression). There were three levels of novelty of pose (low, medium, and high) and seven levels of affect, ranging from extreme negative affect (assigned a value of −3), through neutral affect (assigned a value of 0) and on to extreme positive affect (assigned a value of +3). There were six different instances of each of the 21 combinations of novelty and affect for a total of 126 pictures.

Procedure

The slides were arranged so as to be presented in six blocks of 21 pictures per block. Within each block there was one instance of each of the 21 pose/affect combinations, and the ordinal position of the slides within a block was randomly determined. Thus, the variety of pose/affect combinations was evenly distributed over the experimental session.

Subjects were given instructions to rate each slide on two dimensions as soon as it appeared—the degree to which it "exhibited qualities of good art" and the degree to which it "exhibited qualities of good photography." For these ratings a seven-point scale was used, with the anchor of "1" indicating "very little," and the anchor of "7" indicating "very much." No attempt was made to define or to give examples of good photography or good art. For their task, half of the subjects were instructed to make the artistic evaluation first, and the other half were instructed to make the photographic evaluation first.

Subjects saw the slides in a single group meeting. The slides were projected onto a standard pull-down lecture hall screen, and had a projected size of approximately 3 × 5 feet. Subjects were allowed approximately 8-sec per slide for their two evaluations.

Results

Mean photographic and artistic merit scores were determined for each subject for each of the 21 pose/affect combinations (based on the six instances per combination). These scores were entered into an analysis of variance that had Novelty (low, medium, high), Affect (−3 through to +3), and Evaluation (artistic or photographic) all as within-subjects factors.

There were significant overall (i.e., collapsing over artistic and photographic judgments) effects of Novelty, F (2, 118) = 10.84, $p < .001$, Affect, F (6, 354) = 39.06, $p < .001$, and their interaction, F (12, 708) = 3.95, $p < .001$, which replicated results previously reported by Marshall and Thornhill (1991). Figure 1 shows these effects. In both conditions subjects generally gave higher ratings for medium novelty and increased positive affect. Further, subjects gave higher ratings to negative affect expressions when they were in the medium novelty condition.

However, the most important comparisons were those involving artistic and photographic judgments. The main Evaluation effect failed to reach significance, F (1,59) = 3.10, $p > .05$, so there was no single, overall, consistent difference between artistic and photographic evaluations. However, the Evaluation factor did interact significantly with Novelty, F (2,118) = 6.39, $p < .01$, and with Affect, F (6,354) = 3.13, $p < .01$, but the three-way interaction between Novelty, Affect, and Evaluation failed to reach significance, $F < 1.0$.

Figure 2 depicts the Novelty × Evaluation interaction and shows that subjects are more conservative, overall, in their ratings of "good art" compared to "good

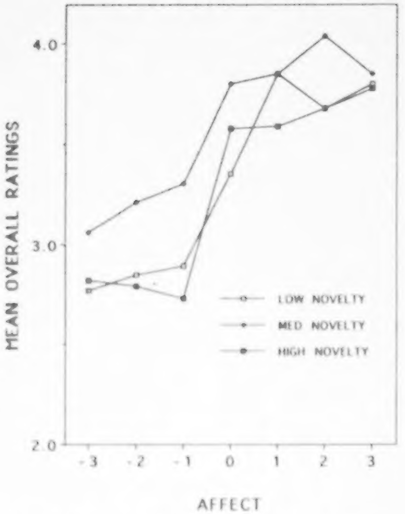

Figure 1. *Main effects of novelty and affect on combined artistic and photographic ratings.*

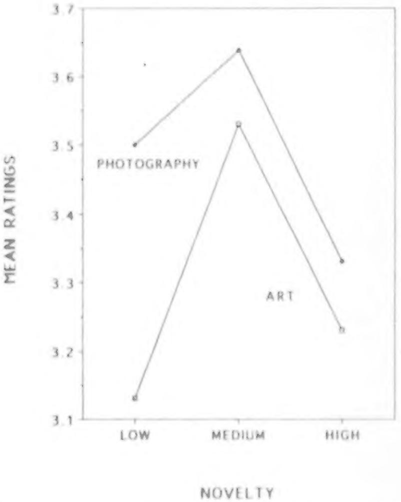

Figure 2. *The effect of novelty on artistic and photographic ratings.*

photography," and that the relative ratings are comparable except for the low novelty poses which were seen as having substantially greater photographic "goodness" and less artistic "goodness."

Figure 3 depicts the Affect × Evaluation interaction and shows that subjects gave higher ratings for photographic "goodness" overall, and that increases in positive affect yielded less of an increase in artistic "goodness" than in photographic "goodness."

Discussion

An initial observation of the data is that our subjects did not consider the set of pose/affect combinations they viewed as being particularly high in either artistic or photographic quality. This is indicated by the fact that mean evaluation scores presented in Figures 2 and 3 never rose above the middle rating value of "4." This is consistent with the results of Marshall and Thornhill (1991) in which the highest probability that these photographs would be taken was just about 65 percent. So we know that subjects in the present and previous studies are consistent in not being overly enchanted with the set of images used. Nevertheless, there is a consistency in the data from these studies, and neither data set is subject to the criticisms that subjects were insensitive to the treatments, or that there were ceiling and cellar effects operating to reduce variability.

In both studies moderate novelty of poses and increasing positive affect received the greatest endorsement. However, there were noteworthy outcomes from comparisons between artistic and photographic "goodness' in the present study, and these may be used to answer its main questions: what is the nature of the artistic "goodness" response to changes in novelty and affect, do the judgments of artistic and photographic quality parallel each other, and can one

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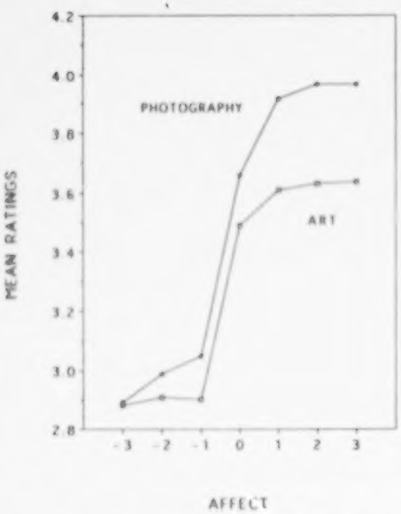

Figure 3. *The effects of affect on artistic and photographic ratings.*

conclude that these judgments are based on the same underlying operations and processes?

In addressing these questions, inspection and analysis of our data allow us to conclude three things. First, the overall responses patterns as a function of variations in novelty and affect were generally similar for artistic and photographic judgments. Second, low novelty pictures were judged to have more photographic "goodness" than "artistic" goodness. Third, while positive affect was a requirement for both higher artistic and photographic ratings, increases in positive affect resulted in relatively greater judgments of photographic "goodness" than "artistic" goodness. For the record, negative affect produced uniformly low ratings for both evaluations.

Understanding that low novelty results in lower ratings of artistic "goodness" and increasing positive affect results in higher ratings of photographic "goodness" may help determine when a photograph is considered just a photograph and when it is considered artistic. This is a perfectly appropriate distinction since photography is a medium that may at times be used towards artistic pursuits and at other times not. For our subjects, then, the relative absence of novelty produced very low artistic "goodness" ratings; hence, the presence of novelty was apparently a necessary condition for them to consider the photograph artistic.

As for the smaller effect of increases in positive affect on artistic "goodness" ratings, it would appear that smiles, happiness, and even extreme joy (+3 pictures) were not considered by our subjects as contributing increasingly to artistic merit. This may be a cultural phenomenon having to do with a preference in routine pictures for smiling faces ("ok, everyone smile on the count of three"), and the attitude, valid or not, among artists and lay viewers alike, that true art should contain more sober expressions. Perusing almost any accomplished portrait photographer's collection will reveal few if any smiling faces, and only a little reflection will show this to be true for most art, visual or otherwise, in any style and for any era. So, in fact, a simple, singular cultural explanation may be insufficient.

It would be interesting to ponder other reasons for the bias against too much positive affect. For an example, some might say we cannot adequately reveal someone's "soul" if affect (positive in this case) is acting as a kind of emotional mask. There also are exceptions to the apparent disavowal of negative affect such as Karsh's portrait of the scowling Churchill, some of the photographic essays of W. Eugene Smith, and the constructions of Joel Peter Witkin, but we believe the generality of the avoidance of affect to be accurate.

The present data also offer additional insights into the results of our previous study (Marshall & Thornhill, 1991) which had as its aim the understanding of the roles of novelty and affect as determinants of when photographers would "press the button." In that study we had subjects of various levels of photographic skill: amateur, intermediate, and professional. While the amateurs and intermediate skill individuals performed very similarly, there were differences between these groups and the professionals. In that study, which, in part, assessed the probability that a photograph would be taken, the probability functions for novelty and affect of amateurs and professionals are virtually identical to our present subjects' rating functions for photographic and artistic "goodness," respectively. Comparison of those data to the present data will suggest that the professionals in the previous study, even though operating under intentionally ill-defined instructions to shoot "good pictures," may have been making artistic "goodness" judgments. Specifically, the professionals in the previous study had a particular disdain for low novelty poses and were not as influenced by increases in positive affect, although some positive affect was needed for them to choose to shoot a photograph. On the other hand, one might also speculate that if the naive subjects in the previous study were instructed to "shoot photographs that are *artistically* good," they may very well have responded the same as the professionals. We speculate that a functional difference between less experienced and professional photographers is that while the former may have an *available* artistic sensitivity, the latter have such sensitivity more spontaneously *accessible* during the photographic process.

In conclusion, for our subjects, and for the variables that we investigated, a photograph moves towards artistry when there is little negative affect, some minimum but not excessive amount of positive affect, and a moderate level of novelty.

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Elementary Art Specialists' Comfort Level in Teaching in the Art Museum Setting

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Abstract

This paper presents the results of a study examining the comfort level of elementary art specialists for teaching in the art museum setting, an extension of an earlier study examining elementary art specialists' utilization of the art museum (Stone, 1992). The present study revealed that while elementary art specialists felt relatively comfortable with the idea of teaching in this setting, their comfort level varied according to the content and methods they would use to teach. Findings point to a need for providing prospective art specialists with courses in which they learn specific strategies for teaching in the art museum and methods for teaching art history.

School art education has an important role in orienting future citizens to the art museum. Perhaps one of the most important roles that school art education can fulfill is to instill in students an appreciation of the art museum as an important institution in which to learn. Art education instruction can assist students in acquiring the requisite skills for learning from original works of art and help them become sensitive to their unique qualities. In short, art education instruction can help students feel comfortable in this environment as future adults (Zeller, 1983).

If art education instruction is to orient students to the art museum, we must ask whether art specialists are adequately prepared to do this. If art specialists are prepared to teach in the art museum then they will feel at ease in providing instruction to students in this setting. The present study was conducted to investigate the comfort level of art specialists for teaching in the art museum setting. Comfort level has not been examined in the research literature.

This research is a follow-up study of an earlier research project investigating the utilization of the art museum by elementary art specialists (Stone, 1992). The results presented here suggest areas for consideration in the area of teacher preparation.

The Problem

Art specialists face a number of obstacles in using the art museum as resource. Some of these obstacles are imposed by the school. Heavy schedules of classes, the lack of transportation and monies, field trip limitations, and unsupportive school administrators are just a few problems that must be overcome before museum visits can be planned and implemented. Another set of problems stems from the professional lives of art museum educators and art specialists. Art museum educators and art specialists work in completely different milieus and are unaware of respective problems, values, limitations, and expectations (Harrison & Naef, 1985; Newsom & Silver, 1978).

Perhaps the most serious obstruction experienced by art specialists is their lack of training for use of this resource. Zeller (1987) pointed out that art specialists are ill prepared to integrate the art museum into the classroom and attributed this to the studio oriented teacher preparation programs where these teachers' training was completed. A recent study (Stone, 1992) found that elementary art specialists utilized the art museum with minimal investment of effort and without integrating the museum experience into the classroom. Newsom and Silver's 1978 report of nationwide art museum education programs noted art specialists'

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lack of training for integrating art history in the classroom.

A lack of preparation for utilizing the art museum could lead to a discomfort in teaching in this setting. Zeller (1983) has observed that art specialists do not feel comfortable with discussing works of art in museum galleries leaving the responsibility of teaching to docents who typically are not trained as art educators. The author attributed teachers' discomfort to insufficient education. A nationwide survey (Stone, in-press) of secondary art specialists found that only just over half the sample toured students through art museum galleries themselves. Apprehension about teaching in the art museum setting could encourage art specialists to abdicate their teaching responsibilities to docents. As museum volunteers, docents, are distant from the educational life of students and are often not prepared to make a museum visit meaningful to them. Consequently, learning outcomes may be superficial and unrelated to the classroom. Even in those instances where art specialists elect to give their own instruction, learning outcomes may not be realized; art specialists, if uneasy about teaching in the art museum, will be ill-equipped to deliver effective instruction in this setting. Museum visits represent, at best, three to four hours out of the students' school careers. This fact underscores the need for instruction that will make the art museum meaningful to students as future citizens. Ultimately, as art educators we must discover ways to best educate prospective art specialists to meet this challenge.

Purpose of the Study

The author designed a study to examine the question of elementary art specialists' comfort level in teaching with original works of art in the art museum in an effort to explore the adequacy of teacher preparation. This is a follow-up study to an item included in an earlier research project (Stone, 1992) which examined elementary art specialists comfort level in using original works of art as part instruction. Responses to the item showed: 40% felt very comfortable, 29% comfortable, 15% somewhat comfortable, 9% minimally comfortable, and 6% not comfortable. The study presented here further explores this question and addresses the following:

1. How comfortable are elementary art specialists in discussing original works of art in the art museum setting?
2. Are they at ease in discussing specific information pertaining to works of art (artistic style, iconography and social/cultural/historical context) and using methods of relaying information (lectures, gallery games, improvisational techniques, inquiry/discussion, and guided discovery) in the art museum?
3. What factors might influence respondents' comfort level arising from the museum setting?
4. Are elementary art specialists at ease in discussing works of art in their own classroom setting and what time is devoted to such discussions?
5. What kinds of instruction could better prepare elementary art specialists to teach in the art museum?

Method

Instrument

The author developed a questionnaire to explore issues related to the comfort level of elementary art specialists. The instrument had a total of nine items; four of these had sub-parts. Likert scale, multiple-choice, and open-ended response formats were used to elicit information concerning respondents' comfort level. Rank order, multiple-choice and open-ended response formats were also utilized to obtain respondents' perceptions about both the adequacy of educational preparation for teaching in the art museum setting and factors affecting their teaching experience in this setting. The instrument was field-tested on three different occasions with: art education undergraduate students, art education graduate students, and elementary art specialists currently teaching. The results of the pretesting process contributed to the revision of the instrument. The wording of questions was refined, the sequence of questions was changed, and additional pertinent items were included.

The instrument requested information of elementary art specialists about: (a) their comfort level in teaching in the art museum setting, discussing artistic style, iconography, and social/cultural/historical context and using lectures, gallery games, improvisational techniques, inquiry/discussion, and guided discovery/ (b) their comfort level in discussing reproductions in their classroom and time devoted to such discussions; (c) their perception of the art museum setting as a comfortable context in which to teach; (d) factors that affect their comfort level such as the atmosphere of the museum, attitude of museum staff, and knowledge of the collection; (e) their preparation for teaching in the art museum setting; (f) and ways to improve pre-service education for utilization of the art museum.

Subjects

Participants in the study were randomly selected from a sample of 505 included in the earlier study. A total of 202 respondents were selected; the questionnaire was returned by 89 respondents yielding a response rate of 44%. Three questionnaires were removed from the sample because respondents were retired or were no longer teaching art.

The Results

Closed-ended items were computed and frequencies for these items are given in rounded percent. Open-ended questions were analyzed by identifying categories for respondents' comments. Responses were coded by using identified categories. Salient responses are presented in text form.

Comfort Level

The results showed that 41% of elementary art specialists felt very comfortable and 44% felt comfortable in discussing original works of art in the art museum setting. Only 12% reported they would be somewhat comfortable and 3% said they would feel minimally comfortable. No respondents indicated "not comfortable."

Respondents were asked how comfortable they would feel in talking to their students about works of art in terms of artistic style, iconography, and social/cultural/historical contexts. Respondents were also queried about how at ease they would be using specific methods of relaying information in this setting such as lectures, gallery games, improvisation, inquiry/discussion, and guided discovery. The findings showed that comfort level varied according to type of information discussed and the method used to communicate this information (See Table 1).

The sample was most at ease with discussing the artistic style of a work; a total of 86% felt from comfortable to very comfortable with this approach. The sample was less at ease with talking about the social/cultural/historical context of works of art. Of respondents, 69% said that they felt from comfortable to very comfortable with this approach. Elementary art specialists were the least at ease with discussing the iconographic dimensions of works of art. Only about one quarter (23%) said they were very comfortable with this approach and just over

Table 1. Respondents Comfort Level in Talking to Students About Works of Art in the Museum Setting

Categories	Very Comfortable	Comfortable	Somewhat Comfortable	Minimally Comfortable	Not Comfortable
Approaches					
Discussing artistic style	49% (n = 84)	37%	14%		
Discussing iconography (subjects & symbols)	23% (n = 84)	34%	26%	17%	
Discussing social/cultural/ historical context	29% (n = 83)	40%	19%	8%	4%
Methods					
Lectures	25% (n = 84)	42%	17%	14%	2%
Gallery games	29% (n = 83)	43%	17%	6%	5%
Improvisational techniques	14% (n = 84)	29%	29%	20%	8%
Inquiry/ discussion	53% (n = 84)	36%	11%		
Guided discovery	46% (n = 84)	42%	10%	1%	1%

one third (34%) said they were comfortable.

Most elementary art specialists (89%) reported they were comfortable to very comfortable with using inquiry/discussion as a method for relaying information; 88% said that they felt from comfortable to very comfortable with guided discovery. Respondents appeared to be moderately at ease with using gallery games; 29% were very comfortable and 43% were comfortable. As far as using the lecture method, one quarter (25%) said they were very comfortable and almost half (42%) reported they were comfortable. The sample was not at ease with the idea of using improvisational techniques. Only 14% of respondents indicated that they were very comfortable, 29% were somewhat comfortable, and 20% were minimally comfortable.

Respondents were queried about how at ease they felt talking to their students about works of art (slides or reproductions) in their classroom. Results showed that the sample appeared to be very comfortable with a mean of 1.66 (1 very comfortable and 7 not comfortable). Respondents indicated that they devote a mean percent of 19 of in-classtime to this activity.

The Context

The sample found the art museum setting to be comfortable for teaching their students with a mean of 2.69 (1 very comfortable and 7 not comfortable). The majority (76%) of respondents said that their rating applied to all art museums. An open-ended question requested respondents to explain their rating. Comments revealed that ratings were based on the following: concerns pertaining to students (behavior and group size), the art museum's receptiveness, accessibility of the art museum, and field trip demands (scheduling problems, transportation, etc.). When asked to rank order the determinants of their comfort level (1 the most important and 6 the least important determinant) respondents indicated that, on the average, knowledge of the art museum's collection was most important (mean = 2.36). The remainder of rankings were as follows in their order of importance: familiarity with museum (mean = 3.18), their audience (mean = 3.36), atmosphere of museum (mean = 3.56), attitude of museum professionals (mean = 3.77), and art museum's policies (mean = 4.73).

Preparation for Teaching in the Art Museum

Elementary art specialists felt, to some extent, prepared to talk to students about original works of art with a mean of 2.69 (1 very prepared and 7 not prepared). The sample, however, appeared divided about their college education as adequate preparation for teaching in the art museum setting. Just over one half (51%) of the sample said that their college education prepared them while 49% reported that it did not. Respondents rank ordered college courses considered useful using a scale of 1 through 6 (1 represented the most useful and 6 the least useful). The results showed that art history was the most useful (mean = 1.84) and studio was the least useful (mean = 4.30) The following is the remainder of courses ranked in their order of usefulness: art criticism (mean = 3.27), art appreciation (mean = 3.36), art education (mean = 4.03), and aesthetics (mean = 4.18). Unsolicited comments from respondents revealed that, in general, the sample's knowledge of how to use the art museum stems from their own research and experience. An open-ended item questioned the sample about the kind of college course that could have better prepared them. Responses indicated that course material should address: how to use the art museum including techniques for teaching in this setting, teaching demonstrations and actual teaching experiences in museum galleries, and curriculum development specific to this setting.

Discussion and Implications

This study suggests that the elementary art specialists in the sample are at ease with the idea of teaching with original art in the art museum setting and that the sample found this environment to be a relatively comfortable context in which to teach. However, comfort level for discussing works varied according to the kind of information covered and the teaching methods used. The fact that respondents reported knowledge of an art museum's collection as important indicates that knowledge about art on a variety of levels and familiarity with a museum may be related to the question of comfort level.

It is revealing that, while the sample reported a measure of preparedness for teaching in the art museum, they were divided about the preparation received through college work. Since the mean age of respondents was 40, many in the sample were probably educated during the time when the National Art Education Association set forth standards for teacher preparation which included art history, art criticism, and aesthetics (Rogers & Brodgon, 1990). These subjects may serve to support the utilization of the art museum but may not be provided with needed instruction for teaching in this setting. According to respondents, course content that deals with the art museum would be beneficial including specific methods and strategies for teaching in this setting. Another type of instruction that may assist art specialists for teaching in the art museum is a methods course for teaching art history. The sample, although comfortable about discussing the artistic style of original works of art, were less at ease with the idea of discussing iconography (images and symbols associated with a subject) and the social, political, and historical dimensions of works of art. Course work in these areas could expand art specialists' ability to discuss works of art in the art museum as well as in the classroom.

This study points to an area of teacher preparation that deserves further examination. Art specialists when teaching in the art museum setting are in the important position of helping their students appreciate the resources of the art museum. Future research should investigate ways to best prepare art specialists for this role.

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Visual Arts Research
(ISSN 0736-0770), formerly *Review of Research in Visual Arts Education,* is published twice yearly (Fall and Spring) in cooperation with the Office of Continuing Education and Public Service and the School of Art and Design of the University of Illinois at Urbana-Champaign.

Subscriptions: Subscriptions are $16.00 for one year for individuals ($23.00 foreign); $27.00 for institutions ($34.00 foreign). Single issues are $10.50. Prepayment is required; make check or money order payable to University of Illinois, in U.S. dollars. Address orders to *Visual Arts Research,* 143 Art and Design Bldg., 408 Peabody Dr., Champaign, IL 61820. Send mailing label from most recent copy when requesting a change of address.

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Commonsense Aesthetics of Rural Children

Norman H. Freeman
Daniella Sanger
University of Bristol

Abstract

Children's commonsense theory of art emerges gradually over many years. A realist method of reasoning gradually gives way to an understanding that art is an intentional manifestation of mind. Interviews with rural children, aged 11 and 14 years, revealed that a conception of the role of the artist in picture-production emerged before a conception of the role of the beholder.

What makes some pictures beautiful? What makes some pictures better than others? The most interesting fact about philosophical aesthetics is that such simply-formulated questions of evaluation are so very hard to answer. The study reported below documents a simple technique for getting children to make inferences about pictures: their answers can be classified to reveal something of the *assumptions* they make about pictorial beauty and goodness. "We understand people well only when we understand the assumptions they make" (Parsons, 1987: 3).

Thinking about Pictures

The supposition is that children's assumptions are acquired through repeated encounters with artworks, both as producers and as beholders. Gradually, the children acquire a reflective awareness of the judgments they make, resulting in a theory of art (Freeman, 1991). The particular patterns of assumption that emerge will doubtless be shaped by the surrounding culture. It may be that the culture will provide taboos against depiction of the human figure, or of the gods, or of scenes of poverty, or will legislate that any referent is equally legitimate for the exercise of pictorial imagination. There is no question but that the child's framework theory of art is culturally constrained. What becomes constrained is the child's conception of how art serves human beliefs and desires. That is, the pictorial domain is just one of the domains to which children apply belief-desire reasoning. The prevailing culture will doubtless control how far the children get in developing that form of pictorial reasoning. But what is of deeper interest is how the nature of artworks puts peculiar obstacles in the path of any child who tries to think through the questions of why some pictures are beautiful and/or good, and what can be believed and desired of pictures.

A developing theory of art cannot be infinitely plastic. There are some brute facts about art that any reasoning has to respect. One fact is that a picture can trigger a recognition of a scene without having any of the salient qualities of the scene. A picture of an ice-cream is not itself necessarily as cold as an ice-cream: that is the sort of fact that preschool children grasp (Beilin & Pearlman, 1991). Once a picture is seen as contracting a representing relation with a scene (Perner, 1991), a number of questions become very difficult to think through. Thus, if you can have a nonfreezing picture of an ice-cream, can you have a nonugly picture of an ugly scene? Why would anyone admire a picture of a scary spider? The point here is that the peculiar properties of the representing relation in triggering scene-recognition without transportation of scene-properties onto the picture-plane raises a particular set of problems in explaining where pictorial beauty and goodness come from. The

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prevailing commonsense culture may well provide anodyne formulations for dealing with such problems: "beauty is in the eye of the beholder," "there's no accounting for taste," "nobody can tell you what you like," and so forth. Hopefully, a good art-educator will help children become a little more sophisticated than trading in the smallchange of commonsense aesthetics. The point of deeper interests is what it is about artworks that legitimates diversity of opinion in commonsense aesthetics.

Let us now put together the above two paragraphs of this section. The first paragraph contained the assertion that children acquire a theory that takes the form of belief-desire reasoning, and come to apply that reasoning to pictures. The second paragraph contained the assertion that the same consideration which is a puzzle for children in acquiring a theory of mind, the fact that mental representations are not replicas of situations, makes it difficult to acquire a theory of art. Parallels between mental and pictorial representational puzzles have been well formulated by Perner (1991). In the next section we specify the basics of a mentalistic theory of pictures and then show how it can be used to generate expectations about children's pictorial reasoning.

A Mentalistic Theory of Pictures

Wollheim (1993) discussed the stark opposition between theories that are based on the assumption that (a) pictorial significance is an objective property of pictures that beholders attempt to detect, and (b) pictorial significance is constructed by an act of judgment of the beholder. Wollheim commented that the latter assumption "is an appropriate response to the central fact about art: that it is an intentional manifestation of mind" (p. 134). The general point is not a new one. Langer (1957: 61) had written about the representing relation that "symbols are not proxy for their objects, but are *vehicles for the conception of objects. . . . It is the conceptions, not the things, that symbols directly 'mean'* " (ital. orig.). Pictures indeed contract relations not only with 'things' (triggering a recognition of a scene) but with the mind of the producer (the person who attempts to realise a pictorial conception) and with the mind of the beholder (the person who attempts an uptake of the pictorial communication). A map of such relations would reveal the entities over which the child's emerging theory of art has to range. But before presenting such a map, let us note the force of the term 'intentional' in the formulation of the central fact about art as being an 'intentional manifestation of mind'. The term 'intentional' has had a particular significance in psychology over the past decade.

Searle (1983: 1) opened his book *Intentionality* with the informal remark that "As a preliminary formulation we might say: Intentionality is that property of many mental states and events by which they are directed at or about or of objects and states of affairs in the world. If, for example, I have a belief, it must be a belief that such and such is the case . . . if I have a desire, it must be a desire to do something or that something should happen or be the case." All intentional states specify *relations* between something and something else. The peculiarity of pictures as intentional objects is that the intentionality is spread over many relations in the following way: a picture that is *of* something is not *directed at* that thing but at beholders, and the picture may be *about* (expressive of) the attitude of the artist toward the scene. In such a case, children are faced with a puzzle, once they grasp the 'central fact' of art: where should the beauty of goodness of a picture be found in that net of intentional relations? Let us try a thought experiment of a traditional type in order to expose the alternative answers.

Figure 1 shows the most basic intentional net of Artist, Beholder, Picture, and

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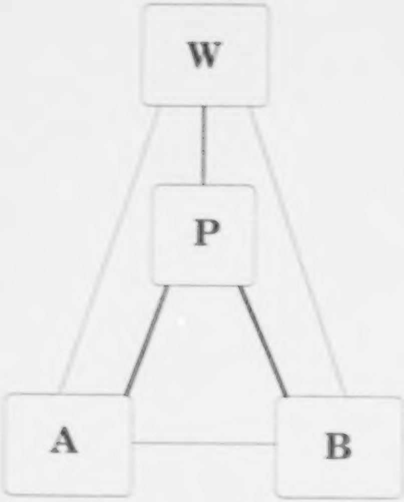

Figure 1. *The net of intentional relations that defines a picture (P) as being at the center of relations with Artist (A), Beholder (B), and World (W)*

World. Each of the six intentional relations is a potential source of pictorial quality, each relation contributing in a different way. Let us try the traditional technique of ablating one relation at a time, and then assessing the consequences for pictorial reasoning. We begin with ablating the World as a source of beauty. One can delete the World so that Artist and Beholder have no access to it apart from what recognition the picture itself provides. If there is no actual World for the picture to represent, and yet the picture still triggers a recognition, conceptions of the referents must be found in the minds of people. A unicorn is a good example. Let us give a brief example of a pilot study discussed in Freeman (in press). If you ask children whether they can tell if any picture is beautiful or not they either regard it as a trick question or tell you that you obviously can see if a picture is beautiful. Yet when Melanie King and I asked 16 urban English 11-year-olds "how could you tell if a picture of a unicorn was beautiful if you've never seen a real unicorn," only 5/16 said that you could tell by looking at the picture and seeing how it was drawn. Five children simply said they did not know how one could tell, and one child said that the question was "a bit hard" and fell silent. The remaining 5 children all centered their replies on whether unicorns themselves were beautiful (and as one child said, "Well, it's just taken for granted the picture is right"). In sum, a question that draws attention to an ablation in the intentional net (here, the Beholder-World relation) can expose a lack of dexterity in the children's use of their theory of pictures.

It may reasonably be objected that such a procedure is problematic. Surely one should ask children less taxing questions, questions that do not saliently draw attention to ablations in the intentional net. Accordingly, let us turn to a simpler ablation, one that seems to suggest simpler questions to ask children.

Imagine that a child does not know that artists become versed in the skills of giving aesthetic pleasure. Where would such a child think that pictorial beauty came from? There are three possibilities in the intentional net. The first obvious option left to the child is to believe that beauty is in the eye of the beholder and that beholders like whatever their beliefs and desires of pictures lead them to like. It seems rather implausible that children would opt for that position. If the children do not grasp the role of the mind of one person, the agent who actually produced the picture, it is unlikely that the children would assign such power to the mind of the apparently more passive person, the picture-perceiver. However, it is easy to test for the presence of such a belief.

The second possibility is that the child will believe that beauty is an objective property of some pictures. That is, some pictures are beautiful in the way that some pictures are monochrome or are rather large. Note that such a conception of beauty is a matter that can be put to direct test. A picture can be monochrome as an objective fact and yet be a picture of a rainbow: that formulation is an intentional formulation because it specifies *how* the picture representationally relates to the scene (by being committal about the shape of the rainbow but non-committal about colors—see Schier, 1986). A nonintentional formulation of beauty as an absolute property of some pictures is that the beauty of a picture is *independent* of the scene that is depicted. It is possible that a child would believe that even the ugliest referent could be depicted beautifully, but again there is reason to doubt it (see Parsons, 1987). It is easy to pose children questions to see whether they think that beauty arises within a picture independently of the beauty of the scene.

That leaves a third possibility for the source of beauty; namely that the child will believe that "Beauty is transferred, as it were, from the subject to the painting . . . a painting will have the qualities of its subject, whatever they are. A painting could not be beautiful if it pictured my old and rusting automobile" (Parsons, 1987: 40). It is an attractive proposition to hypothesize that such a belief is precisely what would be developed before the child grasps the role of the agency of the artist. That is a testable proposition.

To sum up, we can characterize a representational picture by its place in an intentional net. A good critical assessment of any particular picture will contain co-ordinated statements on all six relations. We hypothesize that children acquire a critical theory only over a period of many years, as they come to terms with the dispersion of intentionality over the net, the dispersion of what the picture is of, directed toward, and about. The most basic failure to reckon with the intentional dispersion is to collapse the intentional relations into a single one, the representing relation between picture and its referent. It has often been remarked that children are deeply concerned with 'realism' during middle and late childhood: they evaluate pictures by how well the pictures trigger recognition of a scene (see Feinberg, 1987; Taunton, 1980). One can mimic such a focus by ablating an entity in the intentional net: removing the artist's agency, leaves only the scene, the picture itself, or the beholder as sources of pictorial quality. It seems plausible that children will reason that a picture can only be beautiful and/or good if the scene itself has those qualities. Let us finally consider how to put the matter to the simplest empirical test.

Intentional Tests

Let us focus on the term 'good'. Can a picture be good if it is of an ugly scene? That is rather a stark question that might strike children as uncompromisingly forbidding. A softer version to the same end would be whether a beautiful scene would give a better picture than an ugly scene. We expect, at some ages yet to be determined, that younger children would infer that that must be the case; whereas older children would spontaneously recruit the artist as a consideration, and reply that it is up to the artist whether the picture comes out as good or bad. Presumably even older children would recruit the beholder, and explain that beholders have a degree of autonomy in how they evaluate the picture on the basis of picture-scene relations.

One can probe a little deeper into the children's conception of the power of the artist. If children held to a totally realist position on pictures, believing that the world is the sole source of artistic value, they would not believe that *artists' intentions* are at all relevant. That is, they would not believe that an artist can paint a picture with the intention of affecting the beholder's feelings and actually thereby induce feelings. We suspect that even realist children would agree that an artist can paint a picture on *purpose* to make beholders feel happy or sad. The concept of 'purpose' is the simplest conception of intentionality. If the children believe that an artist has that power, do they believe that a *beholder is passive?* That is, if an artist can use a picture as a vehicle for changing the beholder's feelings, one wants to know whether the beholder's feelings will affect her intentional relation to a picture. Do you, as beholder, look at pictures differently depending on your mood? Such a question, put into more child-friendly language, would directly invite children to focus on the role of the beholder in the intentional net.

Again, it is easy to devise questions that focus on the *relationship between artist and beholder*. Does an artist think about how beholders will regard the emerging picture? Would an artist change a picture to suit her conception of beholders' reactions? Golomb (1992) proposed that North American children normally only saw such links after the age of 7 or so years. Before that age, picture production was seen as an isolated activity, confined to artist, picture, and scene.

In the next section we consider the outcome of asking children those questions, and cognate questions. By discussing pictures in the abstract one hopes to expose something of children's reflective awareness of relations in the intentional net. The emerging theory of art is an index of children's potential to take up art criticism whereby pictures *in general* can be discussed in a mentalistic way.

Interviews With Children

The sample of children lived in Anguilla in the British West Indies. There was no formal training in art criticism. The children attended a Sunday school where painting and drawing was encouraged, the normal type of studio work that fosters taking the role of the artist in picture-production. There were 12 11-year-olds and 12 14-year-olds. The teacher was also interviewed. Some of the results reported below, from 4 of the 11 questions, were used as illustrative material on children's grasp of evaluative terminology by Freeman and Sanger (1993). The questions below were given in randomized order.

1. "Would an ugly thing make a worse picture than a pretty thing?"

There was a clear age-related difference, with 10/12 younger children saying that would necessarily happen compared with only 3/12 of the older children (*P* .01, Fisher Exact Probability Test). The data form the top row of Table 1. The older children spontaneously referred to the artist's skill, and the teacher answered "Not necessarily, what is important is the way the picture is drawn." The teacher's belief had not got through to the younger children. Thus, in this sample of rural children, before early adolescence, a realist stance on pictorial goodness was still evident, and the artist had not been brought properly into the intentional net. The next question is whether the children had any conception of artistic agency at all.

2. "Could an artist make a picture, on purpose, to make you feel happy or sad?"

Only one child, a younger one, denied that that was possible. What was interesting was that only 5 children (3 younger, 2 older) could come up with any example of how an artist could induce feelings (largely by using bright or dull colors). Further, the teacher was the only one spontaneously to consider the beholder: "You also need to take into account your mood before you looked at the picture. This gauges how much work or progress the artist has to make to make you feel happy. What is important is the way you relate to the picture." The question arises of whether the children had any conception of a beholder other than as a passive receiver of pictorial information, as follows.

Table 1. Number of Anguillan Children Giving Affirmative Answer to a Question (N = 12 per Age Group)

Synopsis of Question	Age	
	11-year-olds	14-year-olds
1. Would an ugly thing make a worse picture than a pretty thing?	10	3 *
2. Could an artist make a picture on purpose to make you feel happy/sad?	11	12
3. Do a beholder's feelings affect her picture-perception?	3	8 *
4. Do an artist's feelings determine picture quality?	9	3 *
5. Do pictures influence scene-perception?	5	7
6. Do artists think about beholders?	9	12
Probe: Will the artist change the picture?	5	5
7. Do beholders necessarily agree?	4	3
8. Do artists' feelings toward the scene affect pictorial outcome?	12	11
9. Can a beholder infer an artist's feelings?	8	12
10. Can a beholder infer an artist's age?	5	11 *

Notes: Full versions of each question can be found in the text.
* Denotes significant age-related difference.

3. "Let's imagine that you walk past a picture, and one day you are very happy and the next day you walk past the picture again but you're very sad. Do you think that would make any difference to the way you looked at the picture?"

The teacher emphasized that any feelings that were there could be amplified ('stirred up') by a picture. Only a minority of the younger children, 3/12, thought that the beholder's feelings were important in the beholder-picture relation compared with the majority, 8/12, of the older children (*P* .05, Fisher Exact Probability Test). Note that not all of the 14-year-olds had yet brought the beholder into the intentional net. But perhaps that appearance arises from the way the question focused on feelings. The following question asked about whether there is a role for the artist's feelings of happiness or sadness in determining how good a picture will appear.

4. "Will a happy artist make a better picture than a sad artist?"

The majority of the younger children, 9/12, said that would be the case, on the grounds that a happy artist will produce a happy picture and a happy picture is better than a sad picture. That argument propounds a belief which fails to represent the artist's intentional relation to the picture as other than mechanically transferring a property. In contrast, only a minority of the older children, 3/12, held that belief (*P* .025, Fisher Exact Probability Test), with the rest invoking the artist's skill as determining pictorial quality, as did the teacher ("The quality of the artist will determine how good the picture is"). Again, as with question 1, an age-related shift was evident from construing a relation as mechanically transferring a property (the world transferring beauty to a picture, the artist transferring happiness) to an intentional relation that is controlled, in both cases, by the artist's expertise as picture-producer. If we put that together with the answers to question 2 about whether an artist can purposefully influence a beholder's feelings, it is evident that the children are in the process of acquiring a conception of the relation of production in the intentional net that is in advance of their conception of the place of the beholder. Accordingly, it is useful here to consider the answers to the following three questions that attempted to focus children's minds on the role of the beholder.

5. "If you see a lot of things in pictures, does that make you look at the real thing differently?"

That question should give children more information about the intentional net than just asking about beholder-picture relations, since it draws attention to picture-world and to beholder-world relations. In the eventuality, only half the children (5 younger and 7 older) believed that pictures could influence one's relation to the world in any way. What was of interest was that 3 of the 5 younger children who answered affirmatively could only think of examples where the causal chain was reversed so that an attitude to the *world* (e.g., hating spiders) influenced their attitude to pictures. In contrast, each of the 7 older children who gave an affirmative answer argued from picture to world. The teacher commented that "The picture's representational ability is what is important." Overall it seems that it is difficult to bring the beholder into the intentional net. Accordingly, we next consider a question that accords the beholder a place within the relation of production.

6. "When an artist makes a picture, do you think he thinks about how other people will see it, while he's actually making the picture?"

All bar 3 (younger children) agreed that artists do bear beholders in mind (as did the teacher). A subsidiary question had been prepared to probe children's beliefs about how seriously the artist takes beholders' repeated beliefs and desires—**"Let's imagine that the artist made a picture which he really liked, but he thought everybody else would think it was stupid. Do you think he would be likely to change his picture before he put it on show?"** The teacher firmly assented, but only 10/24 children did (5 younger and 5 older), with 2 more (older) saying "sometimes." The other 12 children thought that it was the artist's solitary verdict on the picture that was the determining factor. Finally, we made a last attempt to focus children's minds on the beholder by probing whether children had any conception of a diversity of taste amongst beholders, in the following way.

7. "If a lot of people think a picture is good, do you think others will as well?"

Note that any answer can be justified: all we were looking for here as any indication of a grasp that beholders *may* not agree amongst themselves: 17/24 children (8 younger, 9 older) believed that social consensus is not inevitably total. As the teacher said: "Not necessarily."

To give an interim summary, two things were easy to find out about the children's reasoning. First, the majority of the older children had a conception of a role for the artist in the intentional net that was an advance on the reasoning of the younger children. Secondly, when questions focused on picture-world relations, the younger children tended to take a naive realist position as though pictorial quality was transported directly from world to picture; and they extended that thinking even to the role of the artist with question 4, where happiness was held to be transported to make a 'happy picture'. Those two results serve to document the hypothesized advance by older children in intentional reasoning, in deploying a mentalistic theory of pictures. What was difficult to discern was children's views of the role of the beholder in the intentional net, e.g. only 3/13 of the younger children thought that the beholder's feelings were relevant to picture-perception in contrast with 9/12 thinking that an artist's feelings were relevant in the artist's picture-production.

The following question probed whether the artist's relation to a state of affairs in the world would affect her depiction of the state of affairs.

8. "Imagine that you have two artists. They both make a picture of a dog. One of the artists loves dogs, loves playing with them, and the other artist hates dogs and feels ill if he goes near a dog. Do you think that their pictures would turn out differently or the same?"

The teacher was firmly of the opinion that a positive attitude to the world would yield "a positive picture of a dog; however the artist that does not like dogs will portray the dog in a more negative way." All bar one of the children (an older one) held the same belief. The question then arises of whether a beholder could infer the attitude:

9. "Can you tell what the artist was feeling when he made his picture?"

The teacher reasonably hedged her bets: "That all depends on the picture and how happy or sad the artist was when he painted the picture," and all bar 4 children (younger ones) had no doubts: expressivity comes through a picture to a beholder. However, it is necessary to probe for whether children thought that *all* artists' attributes become transparently transferred to a picture. A useful probe here is to inquire into an attribute that cannot become directly transferred or directly expressed but can play some causal role:

10. "Can you tell the age of an artist from his picture?"

The teacher said "Not necessarily." A majority of the older children, 11/12, were confident that age could be inferred—that younger children do not draw as well as older children or adults—but only a minority, 5/12, of the younger children held that an inference could be made by a beholder (*P* .025, Fisher Exact Probability Test).

In sum, all 12 of the younger children agreed that an artist's feelings toward the world would determine a pictorial outcome (question 8), 8 of those children agreed that the diagnosis would be available to a beholder, and 5 were ready to infer an artist's age. Those figures, 12, 8, 5 can be compared with the corresponding figures from the older children: 11, 12, 12. In short, children's confidence in the inferential ability of a beholder increased with age.

Conclusions

The suggestion is that the older children do indeed assign the beholder some role in the intentional net, albeit the primitive role of an expert detector of what is there. There was no sign of the step that Wollheim (1993) held to be "an appropriate response to the central fact about art," namely a constructivist view of the beholder's judgments. Presumably that step, the assignment of the role of commonsense art critic to beholders themselves, awaits.

Parsons (1987) deduced that children would hold a realist position on beauty, seeing the world as the source of the beauty of a picture. Parsons provided no age-related data. Here we suspect that the age of 12 or 13 years characterizes a shift from naive realism to a mentalistic conception of the artist as 'beautifier.' The younger children were unable to distinguish between the beauty and the goodness of a picture. The data came from rural children, in subsequent work we have tended to find that urban children underwent the shift somewhat earlier, possibly around 9 years of age. The important aspect of the present data is that the younger children were not parroting the teacher's opinion. The teacher and most of the older children had grasped the role of the artist's skill in picture-quality (questions 1 and 4).

Figure 1 laid out an intentional net of six relations. In the Introduction it was pointed out that what characterized an artwork was *intentional dispersion:* a picture may be *of a situation, directed at beholders*, and *about an artist's attitude.* Let us use that to focus on the older children. All bar one of the older children believed in expressivity—they believed that an artist's feelings toward the scene affected the valence of the picture (question 8), all believed that a beholder could infer that influence on production (question 9), all believed that it lay within an artist's power to control the feelings of a beholder (question 12), and all believed that artists bore beholders in mind during picture-production (question 6); though 7/12 of the children set a limit on the consideration whereby they thought that the artist would not let consideration of beholders lead to her changing her conception of a finished picture (probe to question 6). *It is immaterial whether the children are right or wrong in their assumptions.* For better or for worse, those are the assumptions that lay ready to be triggered by simple questioning. Again, it is immaterial whether the assumptions are held with rockhard conviction or are liable to change in an interactive studio context. That is a matter for art education to probe. All we claim for the older children's data is that they give an indication of the assumptions which it would be wise for an art educator to take into account when planning discussions with children.

However, we do suspect that there is some significance to the fact that younger children differed significantly from the older on four questions (questions 1, 3, 4, and 10). Those questions posed particularly sharp alternatives from an intentional perspective. The younger children overlooked the question of an artist's skills in the presence of an ugly scene (question 1) or of feelings during picture-production (question 4) at the same time as denying a role to beholder's feelings (question 3) and being pessimistic about beholders' inferential powers (question 10 and, to a lesser extent, question 9). The younger children have some way to go to extending intentional reasoning over the intentional net.

There is a dearth of evidence on children's acquisition of a mentalistic theory of art. One would need to conduct investigations that systematically probed all parts of the intentional net. We suggest that the present way of asking children to conduct pictorial reasoning is a start. At the very least it enables us to discriminate between formulations in commonsense aesthetics. Thus, the formulation that something is "as pretty as a picture" is presumably liable to be assimilable by even realist children, whereas the formulation "beauty is in the eye of the beholder" can be seen to demand intentional reasoning that may only just be within the range of the older rural children studied here.

Finally, is the present approach anywhere near being on the right lines to exposing children's assumptions? First, there has been a strong tradition of interviewing children when producing their pictures or when reacting as beholders to particular pictures, rather than engaging them in generalized discussion. Parsons (1987) reconstructed his formulations about children's psychology from in-depth interviews in the presence of particular pictures. Why not go for the more direct method of asking simple questions, since question 1 could expose children's reasoning so clearly? Conceivably the use of the present type of interview about general pictorial reasoning in a before-and-after design would be informative about the influence of particular studio practice on children's reflectively-held assumptions. Secondly, it is debatable whether the present formulation of intentionality captures what art-educators want to capture about aesthetics: there is a lack of consensus in the area. Against that, children undeniably come to acquire the language of belief, desire and taste when arguing about pictures (Freeman, 1993; Freeman & Sanger, 1993), and that mentalistic approach to art captures Wollheim's (1993) 'central fact' about art being an intentional manifestation of mind. As Feher and Heller (1986: 21) remarked "The greatest achievement of deductive or philosophical aesthetics is that it chooses the human species for its own point of departure, raising these questions . . . what is the task of art in general? and what is its place in the system of human activities?" The central fact about our species that gives rise to an intepretive theory of art is that we contract complex intentional relations. So do pictures in their capacity as vehicles of meaning. The children's insights may be rather simple, viewed from a perspective of philosophical aesthetics; but to the extent that the children are mentalistically reasoning about artworks as intentional objects, their commonsense aesthetics are on the right lines. Parsons (1987) is a source of as-yet untapped insights about children's progressively sophisticated pictorial reasoning. The present approach differs from that of Parsons in eschewing stage-theory of across-the-board cognitive changes in favor of an uneven penetration of mentalistic reasoning about relations in the intentional net.

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A Cross-Cultural Assessment of the Maitland Graves Design Judgment Test Using U.S. and Nigerian Subjects

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Abstract

Presently there is no acceptable visual art test instrument. Existing tests have failed to live up to claims made by their authors. Although researchers have identified the inadequacies of these tests, no one has conducted a detailed empirical study to ascertain what the tests actually measure, and no one has systematically measured the consistency of subjects' responses across cultures.

This study offers a partial remedy to this situation by assessing the efficacy of the Maitland Graves Design Judgment Test (1946, 1948) in a cross-cultural setting. Specifically, 1,026 high school and college subjects representing art trained and non-art trained backgrounds from the United States (U.S.) and Nigeria participated in this study. Although the main results confirm earlier studies that showed that the test was inadequate in measuring aesthetic judgment as defined by Graves, this study supports Graves's claim that art groups consistently scored higher than non-art groups. The results also suggest that because the U.S. subjects' scores for both the art and non-art groups were higher than the Nigerian scores, the test has limited use in a cross-cultural setting. More important, the results reveal that subjects from the two cultures did respond consistently to three factors: symmetry, three-dimensionality, and complex design.

The quintessence of this paper is the assessment of the Maitland Graves Design Judgment Test (1946, 1948), using U.S. and Nigerian subjects, for the purpose of identifying design items for inclusion in an art test. Cross-cultural studies of this sort are a crucial aspect of the arts today because psychologists and art educators have become increasingly aware of the need to assess cultural issues when testing students from a variety of ethnic backgrounds (Winner, 1982; Ross, 1986; Liu, 1990; Hardiman, Liu, & Zernich, 1992).

To date, attempts by scholars in the arts and in psychology to construct an acceptable visual art testing instrument have been largely unsuccessful (Hardiman & Zernich, 1975; Hardiman, Liu, & Zernich, 1992; Eysenck, 1967). There are two aspects to this problem: (a) the nature of art itself; and (b) finding acceptable definitions for art terms used in the tests. The subjective or objective nature of art is the fundamental issue which continues to produce problems for art-test validity and reliability. The problem is further complicated by the application of differing definitions to art terms in the constuction of art tests (Hardiman & Zernich, 1975). The understanding of many art terms that are basic to judgmental tasks, such as "aesthetic," "preference," and "expression" remain unclear or, as in the case of Child's (1964) opinion, changes over time.

Although, the question of an acceptable, objective measurement of content validity in visual arts tests remains open, few insights have been offered toward finding objective criteria for art test construction. Brumbach (1981) suggested that answers may be sought by investigating what it is that existing art tests actually measure. Crocker & Algina (1986) suggested among other guidelines the identification and investigation of the test score primary uses. Some art tests that are open to such investigation include the Maitland Graves Design Judgment Test (1946, 1948), which is the focus of this paper; the Meier Art Tests, versions I and II (1940, 1967); the Knauber Art Vocabulary Test (1932); and the Horn Art Aptitude Inventory Test (1944).

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The Graves test is a typical example of an art test having several reviews that are short of detailed information. It was rejected by reviewers for lack of evidence of validity (because the author's theoretical assumption was unfortunately affected by changes in individual views of aesthetic values) and for lack of balanced items in the test (Eysenck, 1967; Eysenck & Castle, 1971; Liu, 1990).

While the reviewers may be correct in their observation that the Graves test lacks validity, Eysenck (1967) and Eysenck and Castle (1971) also did not present in detail what the Graves test actually measures. Such information would have provided more understanding of the nature of the test. The purpose of this article is therefore twofold: to reexamine the Graves test in terms of what it actually measures, and to assess its suitability for testing across cultures.

The first hypothesis is that the Graves test does measure consistent design items among subjects. The second hypothesis is that the consistency of subjects' mean score performance on the design items is similar among subjects used in this study. The objective of this study is to assess the possible strengths of Graves test in a cross-cultural setting in order to: (1) Find out which design items are actually responded to in a cross-cultural setting, and (2) Measure the level and consistency of subjects' performance.

Method

Subjects

A total of 1,026 subjects from the United States and Nigeria participated in this study. N = 516 U.S. students (240 art, 276 non-art), and 510 Nigerian students (275 art, 235 non-art). The subjects from both cultures were mainly from the medium- and high-income family backgrounds.

Instrument

The Maitland Graves Design Judgment Test is a self-administering test designed to be used for grades 7–16, as well as adult populations (Graves, 1948; Liu, 1990). The test, as claimed by the author, discriminates between the perceptual and judgmental abilities of artists and non-artists. It also measures the degree to which subjects perceive and respond to eight fundamental principles of aesthetic order: unity, dominance, variety, balance, continuity, symmetry, proportion, and rhythm. The test consists of 90 sets of two or three non-representational designs. The first 79 items are two-dimensional, and the last 11 items are three-dimensional. The test, normally presented in booklet form, was reproduced on professional-quality color film slides for this study.

Evidence of validity was estimated by a comparison of the mean scores of art and non-art students with the main scores from the original Graves test. The art subjects' mean scores from both educational levels suggested that they would perform better on the test than the non-art subjects.

Internal consistency and reliability was given for the 14 groups used in the standardization. The split-half correlation coefficient, using the Spearman Brown formula, produced .81 and .93 (n = 36–246 for each group, N = 1,306). Standard errors of the measurement (sem) were sem = 2.88–3.90 (Graves, 1948).

Procedure

The procedure for the administration of the test was the same at every location in Nigeria and the United States. Differences were only in terms of the rooms, assistants, and dates. At each location, a dark room with a white screen or wall was used to display the slides. In most cases subjects were in groups of 5 to 20. At each location the test started by introducing the subjects to the study, then written instructions were both given and read to them. Subjects were told that they would view groups of designs either two or three at a time. They were told to look at each slide and decide which of the designs they preferred. They were also told that although some of the designs may seem to have equal appeal, they were expected to try in each case to make a single choice. The self-timed slide projector was adjusted for 5-second intervals, within which subjects viewed and responded to each slide by choosing from each set. At the end of the test, subjects were debriefed.

Statistical Analysis

All answers were computed, using two statistical analysis programs: (a) principal component analysis, and (b) principal factor analysis. Statistical analysis of the data includes a computed principal component analysis and a factor analysis, in order to identify factors in the Graves test that seem to suggest response to aesthetic design. The principal component analysis involves a historical comparison of past and present statistical findings on the Graves test; the past being the Eysenck (1967) study and the present being my study of 1993. Principal factor analysis is used for the main analysis in this paper. There is also a computed statistical study on mean scores of subjects based on culture by culture and culture by training.

Results

The results of this study are derived from two analytic assessments. The first assessment involved a principal component analysis of the mean scores of Eysenck's (1967) group and the U.S. and Nigerian groups from this current study.

Principal Component Analysis

Eysenck (1967) administered the 90 items of the Graves Test to 172 male industrial apprentices of 16 to 18 years of age. Matrix inter-correlation on those scores were factor analyzed using the principal component method. The first five factors (which were common to subjects in both Eysenck's and the present study) were rotated to an oblique simple structure by means of promax. These factors are: Symmetry, Three-Dimensional, Complex, Less-complex, and those allowing no interpretation (see Table 1).

Out of these five factors identified as common to subjects in both studies. The first four were interpretable. Symmetrical and three-dimensional items are clearly represented among the three subject groups, with symmetrical design items being the most strongly represented. Eysenck's group responded to 11 three-dimensional items, while the U.S. and Nigerian groups responded to three items each. All groups responded to four similar complex factor items and in the less-complex factor one item was common in all groups.

Further interpretation beyond the data presented cannot be made in this present analysis, because the raw scores of Eysenck's data were not available for statistical computation. However, a more comprehensive factor analysis, which establishes a connection with Eysenck's study, was carried out using the U.S. and Nigerian subjects only. This was based on analyzing all design factors that were common to both groups.

Principal Factor Analysis

The second assessment involved a two-part factor analysis: (a) principal factor analysis of the mean performance scores of the design item variables common to both the U.S. and Nigerian cultures and (b) analysis of the mean scores of common factor variables from both cultures.

Table 1. Factor Loading of the Principal Component Analysis of Three Different Groups of Subjects (Corr = .50)

Common Factors														
1			2			3			4			5		
Symmetry			3D			Complex			Less-Complex			No Inter.*		
EY	US	NI	EY	US	NI	EY	US	NI	EY	US	NI	EY	US	NI
21	21	21	87	87	87	1	1	1	54	54	54	77	77	77
50	50	50	84	—	84	40	40	40	18	18	—	6	56	—
51	51	51	85	—	85	55	55	55	30	30	—	7	76	—
57	57	57	88	88	—	74	74	74	8	—	—	11	—	—
59	59	59	89	89	—	12	—	—	21	—	—	33	—	—
61	61	61	80	—	—	26	—	—	25	—	—	36	—	—
69	69	69	81	—	—				27	—	—	45	—	—
—	6	6	82	—	—				32	—	—	88	—	—
—	22	22	83	—	—				42	—	—	89	—	—
—	37	37	86	—	—				44	—	—			
—	67	67	90	—	—				47	—	—			
29	29	—							51	—	—			
48	48	—							—	—	52			
8	—	—							66	—	—			
—	—	16							78	—	—			
28	—	—							79	—	—			
—	—	33												
—	—	40												
47	—	—												
—	53	—												
—	—	65												
—	—	66												
72	—	—												

EY = Eysenck's, NI = Nigerian.

* No interpretation.

Note: Order of the factor does not necessarily reflect order of variance explained. Items of similarity and difference are ordered in groups by number of common items according to group items allowed in marked order on the test.

The factor analysis of the mean performance scores was carried out at a minimum of .50 varimax with three factor numbers. For better interpretation of the output print, the statistical analysis is presented according to similarities and differences in factor loading (see Table 2).

Factors Common to the U.S. and Nigeria Cultures

Symmetry: Both the U.S. and Nigerian groups show similar responses to ten pairs of two-dimensional, black-and-white designs, most of which are composed of simple lines arranged either symmetrically or asymmetrically (see Table 2, column 1). (The adjective "simple" describes the general nature of the design elements; that is, thin, parallel, straight, or wavy lines.) Differences common to the U.S. and Nigerian groups occurred in the areas of size, color, general appearance, nature of design, and elements of design.

Three-Dimensionality: The U.S. and the Nigerian groups showed common responses to three large black, white, and gray three-dimensional designs. No differences were recorded due to low factor scores in the numbers that were different.

Complexity: Both groups responded to

Table 2. Factor Loadings of the Principal Factor Analysis of Two Scores from US and Nigerian Subjects (Corr. Range = .50 & 60)

Common Factors											
1 Symmetry				2 3D				3 Complex			
US		NI		US		NI		US		NI	
8.92		7.69		3.32		2.77		3.01		3.63	
58.4%		54.6%		21.8%		19.7%		19.7%		25.8%	
Similarities simple lined				Similarities comprehensive				Similarities 3-color			
#	Corr.	#	Corr.	#	Corr.	#	Corr.	#	Corr.	#	Corr.
29	.6	29	.5	77	.5	77	.5	40	.6	40	.5
44	.5	44	.5	88	.5	88	.5				
48	.5	48	.6	89	.5	89	.5				
50	.6	50	.6								
51	.6	51	.5								
57	.5	57	.5								
59	.7	59	.6								
61	.6	61	.6								
66	.6	66	.6								
69	.6	69	.6								
Differences				No differences				Differences			
comprehensive		simple						Regular 3-Color		Irregular B & W	
8	.5	—	—					1	.5	—	—
—	—	21	.5					—	—	26	.5
25	.5	—	—					55	.6	—	—
—	—	37	.5								
42	.5	—	—								
—	—	67	.5								
47	.5	—	—								
53	.5	—	—								
65	.5	—	—								

Final Commonality Estimates Total	
US	Nigeria
15.25	14.09

Note: Labels in order of similarity and differences are explained in the text.

a similar pair of complex, 2-dimensional, black-and-gray designs on a white picture plane. Differences in complexity items have both groups responding to similar items in terms of size and central, frontal placement on the picture plane; color; and general shapes of the design elements, as well as the use of black-and-white values. The U.S. group preferred a regular design, however, and the Nigerian group preferred an irregular design.

Mean Scores of Common Factor Variables

In order to examine the hypothesis that the consistency of subjects' mean score performance on the design items is similar among subjects used in this study, the factor variables of symmetry, complexity, and three-dimensionality that have been identified from the computation of the factor analytic study, were analyzed as follows: Common factor variables were computed to have mean scores. Each value of a response to set design item was weighted one (1) for the correct answer and zero (0) for a missed number. All computations were based on the correlation of .50.

The mean scores of factors common to the U.S. and Nigerian groups on the Graves test are presented in Tables 3, 4.

In Table 3 the mean score performance of the U.S. group is generally higher than the Nigerian group. The U.S. subjects scored higher in both similarities and differences. The Nigerians scored higher only in the similar complex design item variable. In Table 4, the mean scores for the art group for each culture were consistently higher than the scores of the non-art groups.

Discussion

Results from this study were contrary to the research objectives originally stated. However, these data do offer insights to the problem of formulating an acceptable art test instrument that could be used in both a single culture and for a cross-cultural setting.

Overall, however, the art groups had higher mean score performances than the non-art groups. The difference suggests a consistency in performance to the advantage of training in responding to the design items.

Table 3. Mean and Standard Deviation Scores of Common Factor Variables by Culture

		US	Nigerian
Factor		Similarity	
Symmetry:	X	.55	.34
	SD	.33	.29
3D:	X	.44	.30
	SD	.36	.33
Complex:	X	.61	.78
	SD	.49	.41
		Differences	
Symmetry:	X	.66	.31
	SD	.29	.33
Complex:	X	.58	.56
	SD	.49	.50

n = 516 US subjects, 510 Nigerians.

The analysis does not support the hypothesis that the consistency of subjects' mean score performance on the design items is similar among subjects used in this study. However, the analysis did reveal some consistency. The U.S. group did have higher scores as presented in Tables 3 and 4. Also, the art groups did score higher than the non-art groups as seen in Table 4. This indicates that training has an advantage over non-training.

While some discriminatory power of the Graves test can be claimed (the art groups from both cultures consistently performed higher than the non-art groups), its accuracy in a cross-cultural setting is questionable. The U.S. art and non-art groups performed higher than their Nigerian counterparts, which indicates that in its present form, the Graves test was not appropriate for cross-cultural study. And since the test measured only three factorial design items out of the eight originally claimed, the test cannot even be said to be reliable in measuring aesthetic order in the U.S. culture, let alone other cultural settings. However, other implications and interpretations are possible.

In contrast to Eysenck (1967) and Eysenck and Castle (1971), the present study addressed the issue of consistency of design factors and confirmed the potential value of art tests. This present study revealed that there are three factorial design items from the Graves Test that are responded to consistently in both the U.S. and Nigerian cultures: symmetry, three-dimensionality and complexity.

Additionally, the Eysenck (1967) and Eysenck and Castle (1971) studies did not provide a full description of the design elements responded to by their U.S. subjects. In the present study, both the U.S. and Nigerian subjects showed similar responses to symmetrical designs made up of simple lined forms. In the design

Table 4. Mean and Standard Deviation Scores of Common Factor Variables by Culture by Training

Factor		US		Nigerian	
		Art	Non-Art	Art	Non-Art
		Similarities			
Symmetry:	X	.68	.43	.37	.31
	SD	.30	.30	.31	.26
3D:	X	.49	.40	.32	.29
	SD	.36	.35	.34	.32
Complex:	X	.71	.53	.82	.75
	SD	.45	.50	.39	.44
		Differences			
Symmetry:	X	.77	.57	.33	.29
	SD	.24	.29	.34	.31
Complex:	X	.68	.50	.67	.43
	SD	.47	.50	.47	.50

n = 240 US Art, 276 Non-Art; 275 Nigerian Art, 235 Non-Art.

items that showed differences, the U.S. subjects responded to comprehensive designs while the Nigerians responded to simple designs. For the 3-dimensional factor, both cultures responded to comprehensive design items. Lastly, for the complex design factor, the item that both cultures responded to differently was a three-colored item. The design items that both cultures responded similarly to was a regular, three-colored design for the U.S. and an irregular, black-and-white design for the Nigerians.

In the present study the mean scores of common factor variables by culture, and culture by training, supplement the information provided by Eysenck (1967) and Eysenck and Castle (1971). These results reveal that the differences of response remained consistent even when all variables were used. However, in the culture variable, while the U.S. subjects consistently scored higher than the Nigerians in the symmetrical and three-dimensional factors, the Nigerians scored higher than the U.S. subjects in the complex factor. This suggests that while cultural backgrounds were a factor in subjects' responses to the design items, the complex design item factor remains the only one in which the Nigerians scored higher than the U.S.

The practical implication is that symmetrical, three dimensional, and complex design elements could be incorporated in a test instrument for use in any study. It also means that each factor can be expanded by including more variables from each culture. A factor such as symmetry can also be studied in terms of various aspects of test presentation.

It is obvious that further research is needed in the areas of internal and external validity of symmetrical, three-dimensional, and complex design items, as well as the methodology of design and usage. The issue of cultural bias should also be taken into consideration in the construction of art tests. Whether the test is to be used in a single culture or cross-cultural study, emphasis should be placed on making sure that the first stages of research into the art test instrument is carried out by a joint body of experts from each culture involved. The objectives of the art test should also be very specific and expectations should be based on those objectives. Pilot studies should be carried out in various cultural settings before a final selection of the test items is made. Differences in results should be investigated to isolate influencing variables. The final test instrument should also be subject to periodic review.

My speculations from this present study (subject to further empirical study) are that: (a) The similar responses to the three design factors of symmetry, three-dimensionality, and complexity may arise from similar methods of formal education in the classrooms of both cultures; (b) however, the U.S. subjects may be more responsive to symmetrical and three-dimensional design elements than the Nigerian subjects because of the simplified (or basically more stable) societal structure of the United States; (c) on the other hand, the Nigerian subjects may be more responsive to complex design elements than the U.S. subjects because of the more complex, and still developing, societal structure of Nigeria.

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Concurrent Viewing May Alter Verbal Reports about Artwork

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Abstract

Empirical aesthetics and art research take for granted procedures that involve concurrent viewing or viewing of artworks in quick succession. Until recently, the present author also presumed those methods to be acceptable. However, further investigation of previous experiments (Seifert, 1993a, 1993b) brought accepted methodologies for concurrent viewing into question. In fact, concurrent viewing may very well influence naive observers' reactions to particular paintings.

Art is a communicative mechanism. As such, one goal of research in empirical aesthetics is to identify the processes by which that communication occurs. In the visual arts, realistic representations of concrete objects, people, and places communicate information about those same objects, people, and places, and it has been suggested that the human ability to recognize pictures as representations of real-world objects is innate (Hochberg & Brooks, 1962).

Much of the current focus of research methodologies in empirical aesthetics is on processes involved in comparing and distinguishing between works of art (Cupchik, Winston, & Herz, 1992). By measuring the speed with which individuals can make such judgments, it becomes possible to estimate the relative speeds of the cognitive processes involved, and that is of particular concern for scientists attempting to formulate a cognitive theory of art interpretation and/or art production (e.g., Johnson, 1993). Concurrent viewing of artworks is often utilized in experiments of this type.

Another focus of empirical aesthetics is on art education and identifying techniques that might be employed in school and museum settings to improve the quality of education (e.g., Stone, 1992). In the museum setting, concurrent viewing of artworks is also common, and the influence it may have on art interpretation has not been closely studied.

Previous work has taken for granted concurrent viewing methodologies in empirical aesthetics. Many researchers regard those methodologies as both standard and acceptable. Recently, though, comments by colleagues at a professional conference again raised the question that concurrent viewing might prompt viewers to develop certain biases toward art interpretation, and it was the goal of the present experiments to investigate that issue.

Previous research (Seifert, 1993a, 1993b) demonstrated that naive art observers can identify emotional themes depicted in portraits, by virtue of the fact that real-world knowledge of facial expressions is sufficient for that task. Naive observers required no additional instruction or training in order to interpret the works presented them, and that was not surprising, given the extensive research of Ekman (see Ekman, 1992) and his colleagues on recognizing facial expressions.

Unfortunately, additional testing suggested that naive observers may be influenced by concurrent viewing of artworks, and, as mentioned previously, comments of colleagues prompted the current author to investigate the matter more closely. In the present experiments, Seifert's (1993a) studies were replicated, except that an experimental manipulation of solitary/concurrent viewing was added, in order to investigate the issue of concurrent viewing and its potential influence on naive art observers.

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Experiment I

The first study was a replication and extension of a previous experiment (Seifert, 1993a, Exp. 1), and it was conducted because of the concern that subjects in the previous study had viewed all stimuli concurrently. The goal of the first study was to demonstrate that naive art observers can identify emotion as depicted on the faces of key figures in particular paintings. In addition, it was revealed that concurrent viewing of several works of art can influence one's interpretation of individual works, a finding which has important implications for gallery and museum experiences.

Method

Subjects and Apparatus

Twenty-four subjects participated in the first study, and they were all undergraduate psychology students at The Ohio State University. They participated in the study as part of an option to receive course credit and they were not my students. Thirteen males and eleven females between the ages of 18 and 42 years took part ($X = 21.04$ years, $SD = 5.37$), and all subjects reported possessing 20/20 vision or vision that was corrected to 20/20. In addition, a portion of the Ishihara test was used to determine that none of the subjects was color blind. Finally, 22 of 24 subjects had not taken any art, art history, or art education courses at Ohio State prior to participating in the current experiment, but 2 participants had each taken a basic ten-week art course.

The stimuli were color reproductions of the paintings *Self-Portrait* (1889–1890) by van Gogh, *Woman with a Fan* (1919) by Modigliani, and *Pierrot* (1925) by Rouault. The initial selection of these stimuli was for the purposes of a previous study and they were chosen on the basis of various comments by art critics with respect to their portrayal of sadness (see Seifert, 1993a, 1993b). Also, 6 independent raters were engaged in order to verify that the facial expressions were consistent with sadness. As in previous studies (Seifert, 1993a), the raters were naive art observers who had no prior knowledge of the stimuli or of Ekman and Friesen's (1971, 1975) data on facial expressions.

Each rater was given a brief written description of facial expressions corresponding to five pure emotions (see Ekman & Friesen, 1975). In addition, they were presented with all the stimuli for the current studies. Their task was to select no fewer than one and no more than two emotions to describe each picture. This provision allowed subjects to choose two emotions for a single picture in cases that seemed to represent blended emotions, rather than pure ones, and that is particularly relevant to the stimuli for the second study.

Inter-rater agreement was high for *Woman with a Fan* and *Pierrot*, with 100% of the raters selecting sadness to describe them. However, one rater stated that *Pierrot* may also depict anger. Intriguingly, van Gogh's *Self-Portrait* was described as depicting anger by 5 of 6 raters, and 2 of 6 raters described it as sad. Those are slightly different than ratings from a previous experiment (Seifert, 1993a), in which 100% of the independent raters described van Gogh's *Self-Portrait* as sad, with only 1 rater out of 3 selecting anger to characterize it. This indicates that it may depict an emotional blend (Ekman & Friesen, 1971, 1975) of anger and sadness, rather than a pure emotion (i.e., either anger or sadness alone).

The goal of evaluating the comments of art critics was to assess the emotional content of the paintings as judged by art experts (see Seifert, 1993a). The purpose of engaging independent raters who were naive about art and about research on facial expressions was to permit manipulation of knowledge of the research on facial expressions, while maintaining naivete in terms of knowledge of art. Those sources of evidence converged to support depictions of sadness in *Pierrot* and *Woman with a Fan* and of anger (possibly blended with sadness) in van Gogh's *Self-Portrait*.

Twenty-four subjects were randomly assigned to four different groups. The grouping variable determined the stimulus viewing conditions for a given subject, with 6 subjects examining all three stimuli concurrently (i.e., the concurrent-viewing condition) as in previous experiments (Seifert, 1993a). The remaining 18 participants each viewed only one of the three pictures (i.e., single-stimulus condition with random assignment).

One might question the validity of comparing concurrent viewing of three paintings with singular viewing of one painting. The goal of the experiment demands such a comparison. Interestingly, additional tests in the current laboratory have indicated that concurrent viewing of three stimuli and viewing three stimuli separately, but in quick succession, yield similar results, with viewing of one painting influencing judgments of paintings viewed afterward. Thus, the only way to collect discerning data, devoid of concurrent-viewing effects was to permit subjects in the singular-viewing condition to study just one picture.

Procedure

All subjects were asked to make a judgment of aesthetic quality of stimuli (i.e., stimuli in their viewing condition), regardless of whether they viewed three items or just one. Subjects selected a number on a Likert scale (1, 2, 3, 4, or 5) to describe the aesthetic quality of each picture, with "1" representing the best picture they had ever seen and "5" representing the worst picture. Subjects were given no external criteria for making this judgment, and that prevented them from being predisposed to perceive the pictures from the experimenter's aesthetic perspective.

The second task was to briefly describe each stimulus, with 6 subjects describing all three items and the remaining subjects describing only one picture. The purpose of this task was merely to ensure that subjects had sufficient visual acuity and that they could adequately recognize tangible objects depicted in the works of art. Previous research indicated that naive art observers do not have difficulty identifying common objects (e.g., fruit, animals, jewelry) depicted realistically in selected paintings (Seifert, 1992). Viewing time was carefully controlled (i.e., 15 min.), so that subjects in the concurrent-viewing condition would not enjoy an advantage from longer viewing time.

The third and final task provided the critical test of subjects' abilities to identify the emotion(s) portrayed in each picture. Subjects were asked the question, "Which of the following words best describes the emotion depicted in this/these picture(s): sadness, anger, surprise, happiness?" The options were read aloud by the experimenter in a monotone voice with the order pseudo-randomized across subjects. Participants were asked to select the single option which best described an emotion depicted in a particular work, and subjects in the concurrent-viewing condition were also asked to comment on whether the stimuli shared any common theme or emotion (i.e., in an attempt to discover whether subjects felt the pictures overlapped in emotional content). Finally, information concerning the titles, artists, and styles of the artworks was not discussed with subjects until debriefing was accomplished at the end of the experiment.

The awkwardness of the question about "common themes" asked of subjects in the concurrent-viewing condition was most unfortunate. The question was essential, because the current study was a replication of an experiment in which the question had been asked of subjects. In order to discover if the question itself contributed significantly to results, verbal protocols were collected for all subjects following the forced-selection questions, but subjects reported that they felt free to state that there were no common themes, and that indicated that the demand characteristics of the question did not prompt subjects to confabulate about common themes where they did not perceive them to exist.

At the end of the session and before debriefing, subjects were asked, "Would you like to add any comments about your previous judgments?" This afforded them the opportunity to reveal whether their perceptions of the picture(s) fit their forced-selection choice or not. It is of critical importance that verbal protocols added a richness to the data that was consistent with the data from the forced-selection task, rather than contrary to them.

Aesthetic judgments were coded as the mean aesthetic quality for all the stimuli a subject viewed. Data from subjects' verbal descriptions of the stimuli were not coded numerically, but did serve as general indicators of visual acuity, alertness, and investment in the experiment. Finally, based upon converging evidence from surveying art/art history books and from the descriptions of the independent raters, it was determined that the appropriate response to the forced-selection question would be "sadness" for *Pierrot* and *Woman with a Fan* and "anger" for van Gogh's *Self-Portrait*. Responses to the forced-choice question were coded from "1" to "4," with 1 = sadness, 2 = anger, 3 = surprise, and 4 = happiness, but those designations did not assume numerical meanings, because non-parametric statistics were utilized in the analysis.

The critical issue involved subjects' responses to the forced-choice question. Concurrently viewing *Pierrot*, *Woman with a Fan*, and van Gogh's *Self-Portrait* might prompt them to select "sadness" as the best descriptor for the pictures, even though the latter picture might be better described by the option "anger." If that occurred in the concurrent-viewing condition, but not in the single-stimulus condition, then it could be argued that concurrent viewing of different works of art may influence one to respond to an individual work differently than if it were viewed alone.

Results and Discussion

The modal response to the forced-choice question for subjects in the concurrent-viewing condition was "sadness" for all three pictures. For subjects who viewed only one picture the modal responses were "anger" for van Gogh's *Self-Portrait;* "sadness" for *Pierrot;* and "sadness" for *Woman with a Fan*. Chi-square analysis of group differences revealed that there was a significant effect of the grouping variable with respect to van Gogh's *Self-Portrait*, $X^2 = 8.60$, $p < .05$, with subjects in the single-viewing condition being more likely to describe it as portraying anger. It is important to note that the analysis made it possible to include a correction for guessing (i.e., chance performance = 25%) which does not reduce the effect.

Aesthetic ratings were analyzed in order to rule-out the effects of perceived aesthetic quality on the forced-selection test. Average aesthetic quality (i.e., 1 = best; 5 = worst) for all three stimuli as judged by subjects in the concurrent-viewing condition (i.e., with the Likert ratings for all three items averaged) was $X = 3.06$, $SD = .49$. The mean aesthetic rating for van Gogh's *Self-Portrait* for subjects who viewed only that picture was $X = 2.71$, $SD = .78$. The average aesthetic judgment for Rouault's *Pierrot* according to subjects who viewed only that stimulus was $X = 3.25$, $SD = .76$, and the mean preference for Modigliani's *Woman with a Fan* for participants who viewed only that picture was $X = 3.08$, $SD = .49$. Chi-square analysis revealed that there were no significant differences between mean aesthetic ratings across groups, $p > .05$.

Simple linear regression revealed that aesthetic quality judgments could account for 22.5% of the variance in forced-choice judgments, Pearson's rho = $-.47$, with a test of the significance of that relationship yielding, $t(22) = 2.53$, $p < .05$. Caution should be taken when interpreting that result, though, because the range of responses to the forced-choice question was not very broad. Of all 24 subjects, 19 selected "sadness," 5 chose "anger," and none responded with "happiness" or "surprise." Moreover, the data are categorical, so the application of a regression analysis is tenuous at best.

Overall, the results of the first experiment support previous data (Seifert, 1993a, 1993b). Naive observers of art do not require special training to interpret facial expressions of figures in selected paintings. However, these data do suggest that concurrent viewing of works of art may critically influence subjects' responses concerning the emotional themes of the individual works.

Experiment II

The goal of the second experiment was to demonstrate that naive art observers can recognize emotion (i.e., despair) as depicted on the faces of key figures in selected paintings. Specifically, the possibility that concurrent stimulus viewing may influence subjects' judgments about individual works of art was investigated. This study replicated and extended a previous experiment (Seifert, 1993a, Exp. 2).

Method

Subjects, Apparatus, and Procedure

Subject-selection procedures for Experiment 2 were the same as in the first study, but the participants were different than in Experiment 1. As discussed previously, the critical comparison was between subjects who viewed paintings concurrently and subjects who viewed a single painting. Twenty-two of twenty-four subjects had not taken any art, art history, or art education courses at The Ohio State University, and two subjects were currently enrolled in a general art course of which they had completed several weeks. The range of subjects' ages was 18 to 25 years ($X = 19.42$, $SD = 1.53$).

Stimuli for the second experiment were color reproductions of Munch's *The Scream* (1893), Munch's *The Dead Mother and the Child* (1897–1899), and Picasso's *Weeping Woman* (1937). Although *The Dead Mother* depicts more than one person, there is clearly a central figure, i.e., the child in the foreground. For that reason, independent raters and experimental subjects were all asked to focus on that figure when making judgments about emotions represented in the picture.

Stimuli were selected on the basis of evaluations from various art/art history books (see Seifert, 1993a). For instance, Boone (1989) characterized the *Weeping Woman* as "a symbol of the **DESPAIRING** Spanish women during the [Spanish] Civil War" (i.e., boldface type is added). Also, the judgments of independent raters influenced stimulus selection, as in Experiment 1 and previous studies (Seifert, 1993a).

With regard to the pictures for the second experiment, inter-rater agreement was high. For *The Scream,* 5 of 6 raters stated that surprise was portrayed, and 4 of 6 also agreed that fear was represented, with no additional emotions being selected by any of the raters. Rating agreement for *The Dead Mother* was similarly high, with 5 of 6 raters selecting surprise. However, there was a bit less agreement with respect to which emotion was blended with surprise, with 3 of 6 raters choosing fear, and 2 of 6 selecting sadness.

Finally, *Weeping Woman* was assigned the emotion sadness by 4 raters and fear by 4 raters. In addition, 2 of 6 raters chose anger to describe the picture. On the basis of surveys of art/art history books and raters' judgments, it was determined that "despair" would be the best option for the forced-selection question, because the Microsoft Wordperfect (i.e., version 5.1) thesaurus lists "desperation," "hopelessness," "resignation," "depression," "discouragement," "dolor," "gloom," and "melancholy" as synonyms for it, and those terms seem consistent with the notion of surprise blended with fear and/or sadness described by the independent raters. The foils were "anger," "joy," and "humor" (i.e., so that there were two positive-affect options and two negative-affect options). The procedure for the second study was identical to the one for the first experiment, and coding of the dependent variables was the same, with coding of responses to the forced-choice question being 1 = despair, 2 = anger, 3 = joy, and 4 = humor (i.e., with coding assuming only categorical, and not numerical value).

Results and Discussion

The modal response for the forced-choice question was "despair" for all four groups. In fact, ALL subjects selected "despair" as the emotion depicted in the picture(s) they viewed. Chi-square analysis revealed no significant difference between groups with respect to forced-choice performance, $X^2 = 0$, and of course, that analysis included a correction for guessing (i.e., chance performance = 25%).

As in Experiment 1, aesthetic quality was analyzed to rule-out its effects upon forced-choice performance. The mean aesthetic-quality judgment made by subjects who viewed all three stimuli was $X = 3.36$, $SD = .54$. The average aesthetic judgment for subjects who only examined *The Scream* was $X = 3.12$, $SD = .68$, and for subjects who viewed only *Weeping Woman* it was $X = 3.00$, $SD = 0.00$. Finally, for subjects who studied only *The Dead Mother*, the mean aesthetic judgment was $X = 3.67$, $SD = .52$. Analysis of variance revealed that there were no significant differences between groups with regard to aesthetic-quality judgments, $F(3, 20) = 1.92$, $p > .15$. Finally, a regression analysis of the influence of aesthetic-quality judgments on forced-choice performance was not feasible, because of the restricted range of values (i.e., all subjects selected the same response).

Overall, the results of Experiment 2 are consistent with previous research (Seifert, 1993a, 1993b). Naive art observers are capable of interpreting the facial expressions of figures in selected portraits. In fact, they can do this even when the work is abstract (e.g., *Weeping Woman*), provided certain facial cues are present (e.g., the inner corners of the eyes may be drawn up and the outer corners may slant downward; see Ekman & Friesen, 1975).

Most important, the second study revealed that concurrent viewing of several works of art may not always be detrimental to one's ability to interpret individual works. In fact, in Experiment 2, the common emotional themes of *The Scream, Weeping Woman,* and *The Dead Mother* may have enhanced subjects' comprehension of the individual works. It is of critical importance that, in Experiment 2, the absence of a significant effect does not indicate an absence of any interesting behavioral mechanisms. On the contrary, the way in which these data contrast with those from Experiment 1 indicates that concurrent viewing may or may not influence subjects' verbal reports, and that suggests that concurrent viewing should be an important focus of pilot testing for experimenters who plan to utilize it.

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Color Adaptation for Color Deficient Learners

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Abstract

One of every 12 (8%) men and 200 (0.5%) women in the U.S. are born with inherited color defective vision of some type and degree. Most have only mold or moderate color deficiency. Most of these persons can distinguish certain colors as well as persons with normal color vision if they are arranged in an appropriate manner. Using the method of color adaptation described in this article should allow most, if not all, individuals to participate equally in the learning process as well as social and most work-related environments.

Introduction

Facts and Theories about Color Normalcy and Color Deficient Vision

The primary purpose of this article is to demonstrate how appropriate application of color can give color deficient learners equal access to participation in the learning process, help aid in the career selection process and prevention of job discrimination, and help lessen the risk of personal injury when colors are being used in warning labels, signs, and signals. However, experience and a literature review has shown that it is necessary to explore the parameters of color, color normalcy, and color deficiency in order to fully understand the method of color adaptation to be described in this article. Of importance in the introductory section is (a) incidence of inherited color deficiency, (b) color vision and color-specific visual anatomy and physiology, (c) inheritance patterns and color defective vision, (d) types and degrees of color defective vision, and (e) education, career choice, and employment implications for color defectives.

Incidence of Inherited Color Deficiency

Although many diseases or even injuries may affect color vision (Thurline, 1972; National Research Council, 1981), these disorders, termed collectively as acquired color defects, are not related to the type of color deficiency which is of concern in this article. Of interest herein are the various types and degrees of inherited color vision deficiency which are endemic throughout much of the civilized world. This latter type of color vision disorder is an X-chromosome-linked recessive inheritance trait (National Research Council, 1981; Allard, 1983; Fletcher & Voke, 1985) which effects over 8,000,000 Americans (Heath, 1974) or approximately 8% of men and 0.5% of women (Swanson & Everett, 1992). It does not change in type or degree with age, is not related to other visual defects, and has no known cure (Farnsworth, 1951; Paulson, 1971).

The prevalency rate varies according to such factors as method of ascertainment, country, culture, and other variables. For example, as a result of their review of the literature, Fletcher and Voke (1985) cited investigators who found the incidence of inherited color deficiency to be 1.9% among American Indians, 3.7% among African Americans, and 8.2% among Caucasian Americans. A male incidence of 14.47% was found among tribesmen of a remote island south of Taiwan where there was a high prevalence of inbreeding. The broad geographical variance in incidence was, in part, explained by biological factors such as gene flow, selection mechanisms and the rise of mutant genes in combination with circumstances such as migration and mixture of races.

On the theory that physical defects

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occur in combinations, Frey and Krause (1971) studied the incidence of color deficient vision among deaf children. They reported that in an earlier study they had found a significantly greater amount of color defectiveness among mentally retarded children. As a result of their study of 308 children at all grade levels at a state school for the deaf, these investigators found an incidence of 10.7% youngsters with some degree of color deficiency. This outcome was *not* verified by the Johnson and Whitehead (1989) study of 242 NTID students deafened from congenital rubella syndrome (N = 104) and a non-CRS group (N = 138). These authors found no significant relationship between inherited color defectiveness and any deafness etiology.

To further verify this finding, a formal, unreported, total population study was conducted on all deaf students entering NTID from 1984 through 1993 (N = 2998). Each of these students was visually screened upon entrance for visual acuity, color vision, and a personal/family ocular history was obtained. Of these students, 1756 (58.6%) were male and 1242 (41.4%) were female. They ranged in chronological age (CA) from 16 to 47 years with a mean CA at time of entrance of 19.7 years. Color vision screening was performed using the first 13 plates of the Ishihara Test for Colour-Blindness (1976 and 1982, 24-Plates Editions): i.e., the instruction plate, six transformation plates, and six invisible number plates (Ishihara, 1982). The test methodology using more than 2 and/or 4 errors as the fail criteria has been reported elsewhere (Johnson, 1992a).

In summary, each student who failed the color vision portion of the visual screening was subjected to a five-part color vision diagnostic battery including a retest of the Ishihara in written format. This testing was initiated to determine the type and degree of color anomaly and whether the color vision problem was acquired or inherited. The results of the Nagel Anomaloscope Test were used to confirm all other test results since this test is reputed to be the only one which will give a ". . . definitive classification of type and degree of deficit (Thurline, 1972)." Relative to incidence, 122 (4.1%) students were found to have inherited color defective vision, four (0.1%) had acquired color deficiency related to ophthalmologically-confirmed pathologies, and 2872 (95.8%) were color normal. Of those students with inherited color deficient vision, 112 (3.7%) were males and 10 (0.3%) were females. These figures demonstrate that the incidence of color defectiveness among the total male population of deaf students was 6.4% and that among the total female population was 0.8%. These incidence results were in good and fair agreement with those reported by Thurline (1964) of 6.18% for males and 0.45% for females.

Color Vision and Color-Specific Visual Anatomy and Physiology

The posterior portion of the globe (eyeball) is made up of three primary layers including the sclera, choroid, and retina. The outermost layer, the *sclera*, is tough and fibrous and not only helps the globe maintain its shape, but also protects the delicate internal mechanisms of the eyeball from injury. The middle layer, the *choroid*, together with the central retinal arteries and veins protruding onto the retina from the center of the optic nerve disc, provide the dual blood supply for the eye. The innermost layer, the *retina*, contains the sensory receptor cells, the cones and rods, which respond to incoming light waves to provide humans and animals with their sense of sight. Relative to color vision, it is the retina that will be of primary interest herein. These three layers are shown in the small transverse cross-section of the eyeball in Figure 1.

Note in that cross-section the small boxed portion labeled "central vision." In the figure, this section is enlarged in the background to provide a pictorial repre-

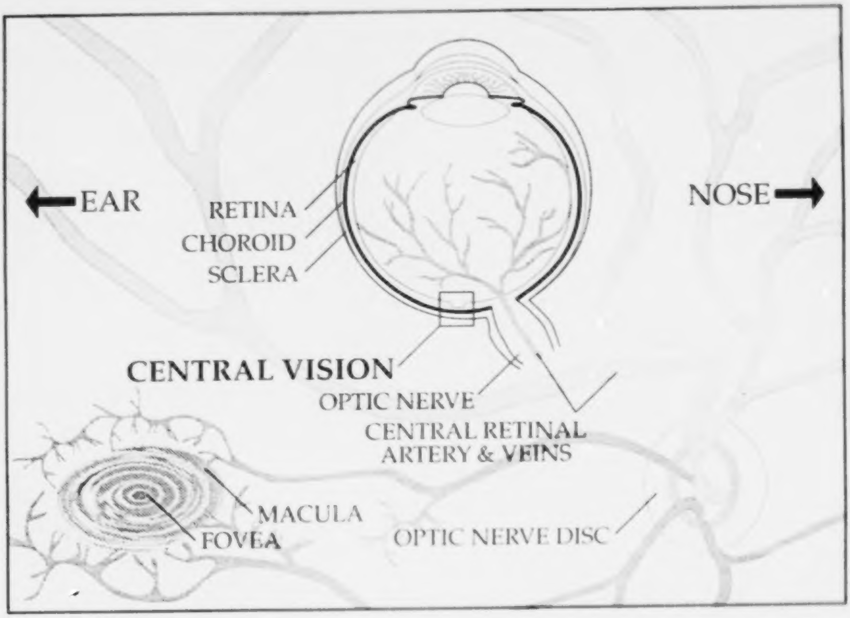

Figure 1. *Schematic diagram of some anatomical features of the eye including a small transverse section of the globe (eyeball) in the center upper foreground, and an enlargement (from boxed-in area) of some retinal features (background) located in the posterior pole of the eye.*

sentation of some of the primary anatomical features located in the posterior pole of the retina. That little 1 square millimeter area located approximately 15 degrees temporally (toward the ear) from the optic nerve disc is the macula. The very center of the macula, an area only 0.4 mm in diameter, is called the fovea of foveola (Guyton, 1981). It is into this tiny macular-foveal area that the eye attempts to focus the incoming lightwaves. If this area is damaged secondary to a disease process or injury, both visual acuity (clarity of vision) and color vision diminish. When the ophthalmologist examines the inside of the eye, he checks the integrity of these anatomical features for evidence that may be indicative of ocular pathology: i.e., waxy disc pallor, vessel attenuation, pigment mottling and clumping. The color vision diagnostic battery also helps to rule out such pathologies.

According to Brown (1973), there are approximately 5,000,000 to 7,000,000 cones spread throughout the entire retina with approximately 2,000,000 of these cone light receptor cells densely packed into the *rod-free* macular area in general and about 35,000 located in the central foveal region (the point of fixation). The number of cones become increasingly less dense from macula to mid- to far periphery. The macular-foveal region provides human beings with their fine form, shape, and color discrimination for daytime vision. For example, relative to color vision, an object which appears to be bright red when viewed by the fovea may appear pink at fifteen to twenty degrees from the point of fixation (fovea) and off-white when viewed with the far peripheral retina. Although the cones in the peripheral retina do not provide clear vision for form, shape, and color, they do provide an alerting mechanism during the daytime hours so that individuals know when objects of potential danger enter their environment.

The rods provide humans with their nighttime vision: i.e., they allow them to dark adapt, and thus, see in dim illumination and darkness. There are approximately 120,000,000 rods spread throughout the entire retina (Brown, 1973). Their numbers are greatest at approximately 20 to 25 degrees (mid-periphery) from the point of fixation (Allard, 1983) and, like the cones, diminish increasingly in number toward the far periphery. Also, like the cones, they provide an alerting mechanism during the nighttime hours or in other dimly-illuminated environments. They are not of great relevance to color vision, and will not be discussed further herein.

According to Wetenbaker (1981), research completed during the two previous decades confirmed the presence of three types of color sensors or photoreceptors contained in the retina. "Different photosensitive pigments enable each to absorb light primarily in the red, green or blue portions of the spectrum. These three types of photoreceptors are called red, green and blue cones." Figure 2 displays a schematic diagram representing the three types of cone light receptors as adapted from Wertenbaker.

The schematic diagram shown in Figure 3 combines the visible color spectrum of Wertenbaker (1981) and Guyton's (1981) light absorption curves. As shown in the lower portion of the figure, light waves occupy only on a small portion of all the electromagnetic spectrum; and although the environment is filled with many electromagnetic wavelengths which are shorter or longer in frequency, the cone light receptors will respond to only those that are contained within the small portion of the spectrum from approximately 400 to 700 millimicrons (or nanometers). Violet and purple wavelengths are the shortest and red and red-purples the longest. According to these two authors, the red cones reach maximum absorption when the wavelengths are approximately 560 millimicrons, the green cones approximately 535 millimicrons, and the blue cones at approximately 450 millimicrons.

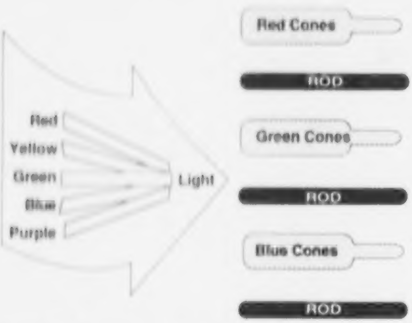

Figure 2. Schematic diagram of the three types of retinal cone photoreceptors as adapted from Wertenbaker (1981).

As shown in the top portion of the figure, it is the *ratio* of the number of red, green, and blue cone light receptor cells that are responding at any single moment that allow humans to see the myriad of colors in the visible light spectrum. For example when approximately 97% of the blue cones are responding and no green or red cones, the color blue is perceived. Likewise, when approximately 83% of both the green and red cones and none of the blue cones respond, the color yellow is perceived. Green is perceived when approximately 67% of the green cones, 36% of the blue cones, and 31% of the red cones are responding simultaneously.

Inheritance Patterns and Color Defective Vision

So-called "red-green" color deficient vision is an X-chromosome-linked recessive inheritance trait which is carried only on the sex chromosomes. [Note, this type of defect is not to be confused with the exceedingly rare hereditary "blue or tritan" color vision defect that shows an

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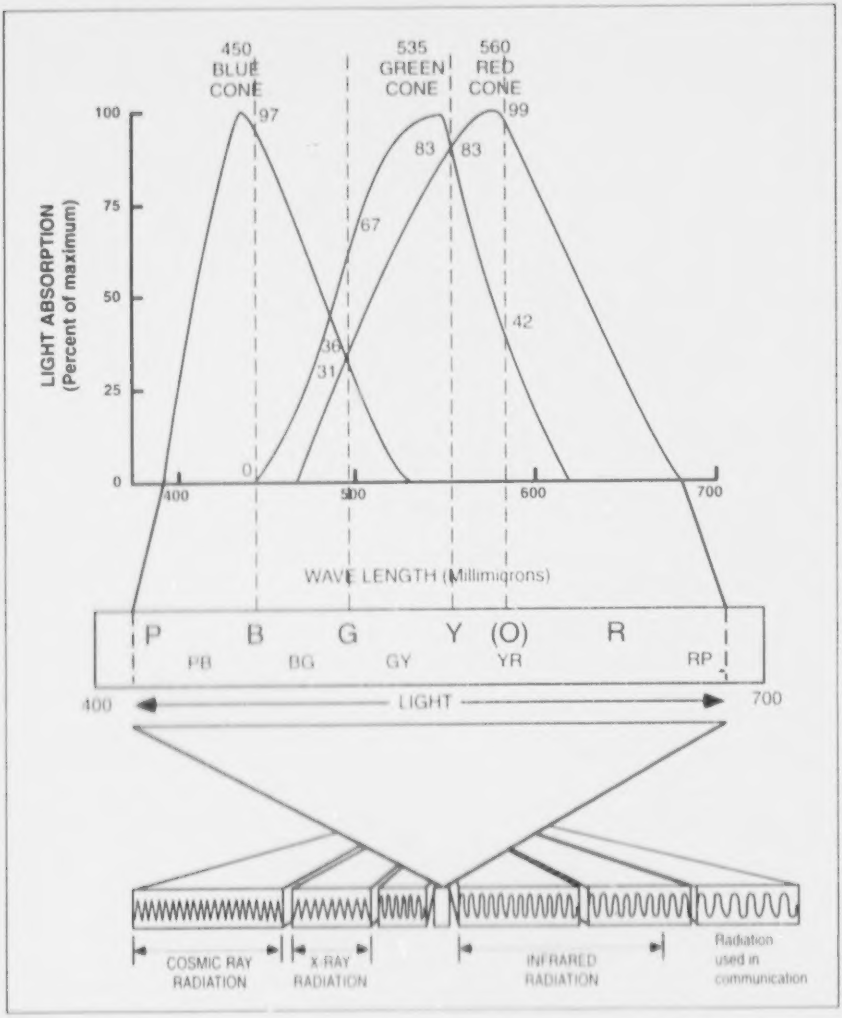
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Figure 3. *An adapted schematic diagram combing Wertenbaker's (1981) visible color spectrum and Guyton's (1981) light absorption curves.*

autosomal dominant type of inheritance pattern with an estimated minimum frequency of between 1/13,000 to 1/65,000 (National Research Council, 1981).] While women have two "X" chromosomes, one inherited from the mother and one from the father, males have only one "X" chromosome from the mother and one "Y" chromosome from the father. In the X-chromosome linked pattern, inheritance is specific to genes occurring on the "X" chromosome, and there is no corresponding gene on the "Y" chromosome.

A male who inherits a defective gene from his mother will always show the defect, while the female must inherit the defective gene from both mother and father for the defect to be expressed. This is why in the United States 1 in 12 males shows the defect which is manifest in only approximately 1 in 200 females (Thurline, 1972). The expected carrier rate for daughters of a color defective father is 100%; and 50% of the daughters of those carrier females will themselves be carriers while 50% of their sons will manifest color defective vision. As mentioned earlier, there will be no change in type and degree with age, it is not related to any other disorder, and there is no known cure (Farnsworth, 1951; Paulson, 1971).

Types and Degrees of Color Defective Vision

There are a number of types and degrees of color defective vision, and as previously mentioned, the mode of inheritance is different between the "red-green" and the "blue" defectives. The primary types and degrees are shown in Table 1 below. Color defective vision may be expressed as either a partial or complete absence of one or more of the three types of cone photoreceptors, and the degree of color deficiency is based on this factor. For example, anomalous trichromats usually have a *partial absence* of one type of cone, but still retain some of all three—hence the term "*TRI*chromat." *DI*chromats have a *complete absence* of one type of cone (most often the green cones), but they still retain two types. The degree of deficiency becomes increasingly worse as one descends within the table: i.e., trichromats, dichromats, monochromats, and finally the achromats who are the only true "color blind" persons. [Note. This latter condition occurs in only about one of every 40,000 people. These people are also called "Rod-Monochromats" because only their rods are functioning allowing them to see in shades of black, white, and gray (Wertenbaker, 1981).]

Gnadt and Amos (1992) express this information in a slightly different manner. They say that individuals with inherited color defects have photopigments (photoreceptors) which are different in some manner: i.e., the dichromats have photopigments which are completely missing while the anomalous trichromats have photopigments which are closer than normal in peak sensitivity (or absorption rate). In essence, the outcome is the same.

Most investigators use differences in terminology to help distinguish between

Table 1. Adaptation of Accepted Nomenclature for Types of Color Defective Persons

Inherited:	
1. Normal Trichromats	
2. Abnormal Trichromats	
A. Deuteranomalous	(partial green defectives)
B. Protanomalous	(partial red defectives)
C. Tritanomalous	(partial blue defectives)
3. Dichromats	
A. Deutans (Deuteranopia)	(total green defectives)
B. Protans (Protanopia)	(total red defectives)
C. Tritans (Tritanopia)	(total blue defectives)
4. Monochromats	(only one type of cone)
5. Achromats	(rod-monochromats)
Pathologicals:	
1. Abnormal trichromats	

Note: Classification of items 4 and 5 above differs according to author. For example, Wertenbaker (1981) differentiates between rod-monochromacy (true color-blindness) and the condition where only one type of cone is present, but does not name it. Heath (1974) places achromacy and monochromacy into the single category in which there is a complete absence of color sensation.

types of color deficiency and their respective degrees (Heath, 1974; National Research Council, 1981; Gnadt & Amos, 1992). The prefixes PROT- (first), DEUT- (second), and TRIT- (third) are derived from Greek, and are used in color vision to refer to the first, second, and third color primaries of red, green, and blue. Generally, the key to degree is found in the suffix: i.e., *-anomalous means partial absence* as in protanomalous trichromat, while -anopia is Greek for blindness (or *complete absence*) as in protanopia (also known as protan).

There is agreement among investigators (National Research Council, 1981; Gnat & Amos, 1992) that there is an inverse relationship between degree of severity within Table 1 and frequency of occurrence: i.e., while the severity of the problem increases as one descends within the table, the likelihood of occurrence becomes less frequent. For example, mild deuteranomalous trichromats are far more common than is deuteranopia. Also, there appears to be agreement that deuteranomalie is far more common than protanomalie, and tritanomalie is rare even in pathological conditions. These facts seem to be true of the NTID population as well. For example, of the 122 students found between 1984 and 1993 to have inherited color defective vision, 85 (69.7%) were DEUTS (Green Defectives), 37 (30.3%) were PROTS (Red Defectives), and none (0.0%) were TRITS. Relative to degree of defect, 96 (78.7%) were mild anomalous trichromats, 23 (18.8%) were moderate anomalous trichromats, only 3 (2.5%) were severe anomalous trichromats or dichromats, and none were monochromats or achromats.

Education, Career Choice, and Employment Implications for Color Defectives

According to Fletcher and Voke (1985), the first extensive survey of inherited color defective vision was made by a gentleman named Wilson, a professor of technology at the University of Edinburgh, in 1855. Since that time, in addition to the many studies on incidence, type, and degree of color vision defectiveness, many investigators have studied the appropriateness and effectiveness of a variety of color vision screening devices and diagnostic tests (Belcher, Greenshields, & Wright, 1958; National Research Council, 1981; Mossman & Young, 1983; Birch, 1985; Long, Lyman, & Tuck, 1985; Haskett & Hovis, 1987).

More recently, investigators have turned their attention to the educational impact of color defectiveness on school children (Gallagher & Gallagher, 1964; Thurline, 1964; Shearron, 1965; Wildman, 1966; Mandola, 1969; Thurline, 1974; Alexander, 1975; Gnadt & Amos, 1992; Swanson & Everett, 1992) as well as the effect of color defective vision on the career selection process and employment opportunities (Heath, 1974; Mossman & Young, 1983; Steward & Cole, 1989; Johnson, 1992a; Johnson, 1992b).

Relative to educational implications, for example, Alexander (1975) stated that color deficiency should be diagnosed at an early age since a large part of the initial educational process involves color identification and ability to discriminate differences in colors. Apparently color vision screening does not happen often enough in most school systems. For example, Steward & Cole (1989) stated that only 12% of the 102 color deficient adults participating in their study could recall having their color vision tested while at school. Moreover, Thurline (1964) stated that an unexpected finding of his study on the more than 10,000 students from all grades of one school district in Washington State was that there was a lack of student, parental, and teacher recognition of the presence of the color deficient vision in a majority of those students identified.

In a most poignant article concerning the educational implications of inherited color defective vision by Gnadt and Amos (1992), these authors presented a single case study of a 7-year-old male who, although his mother suspected he had a color deficiency that might be interfering with his school performance, continued to be *mislabled as learning disabled* by the school administration and the teacher who denied that a color vision defect could affect learning ability. It wasn't until mother managed to get her son transferred to another school that had a different, less color oriented, approach to learning that he finally began to blossom as a student, and it was subsequently found that his intelligence and performance were within normal limits. These authors maintain that color enhanced instructional materials have become commonplace in most schools over the past ten years. They cite as examples the Cuisinaire Rods, Words in Color, Sullivan Programmed Primer, and the rapid rise in use of computers with color displays.

Raltive to the effect of color defective vision on the career selection process and job discrimination, Steward and Cole (1989) stated that many of the color defective people in their study reported that, not only had their color vision defect affected their career choice, but they had been excluded from their chosen occupation. According to Johnson (1992a), probably one of the worst offenders in causing job discrimination among persons with color defective vision is the term "color-blindness" which, in reality, is a very rare condition.

Unfortunately the most popular, sophisticated, efficient, and universally used set of test instruments for identifying color deficiency today, the Ishihara Tests for Colour-Blindness (Ishihara, 1982), probably cause the most problems. Because of their name, people who fail any of the Ishihara Tests are often immediately labeled as "color-blind," and industry and other agencies will seldom employ them (Voke, 1978). For example, some investigators (Peters, 1956; Voke, 1978; Wertenbaker, 1981; Johnson, 1992a) state that the frequent use of the term color-blindness in the literature to describe all degrees of color deficiency has led to a common misconception on the part of the general public as well as physicians and trained lay persons administering the test(s), that persons who fail these screening tests cannot see any colors. As a result of this problem, it is recommended that alternative terminology such as color vision defect, deficiency, anomaly, or abnormality be used since they are more closely identified with type and degree of color vision problems (Paulson, 1971; Heath, 1974; Mossman & Young, 1983; Johnson, 1992a).

Some authors (Heath, 1974; Bensinger, 1992) have listed occupations in which color deficiency either prohibits or may cause a problem relative to obtaining or maintaining employment. A few of those occupations which prohibit employment include navigation, police officer, paint manufacturing, electrical assembler, fireman, and textile grading. Some of those occupations in which color deficiency may cause problems include chemical worker, printer, photographer, graphic artist, microbiologist, and pharmacist. At NTID, when a student is found to have color deficient vision, career advising is carried out by the vision specialist who performed the color vision test battery prior to completion of the career selection process so that the student may make an *informed choice*.

No student is precluded from selecting the career of his/her choice. Although a longitudinal study is still ongoing, research is being carried out to determine those career areas in which students with various types and degrees of color defective vision are or are not being successful academically and/or in which they have or have not been successful in obtaining or maintaining employment because of their color anomaly. Surprisingly, one student with a moderate color anomaly elected to pursue a degree in fine arts. He has been very successful both academically and on his job. Not only have the form and shape of his designs been excellent, but his unusual color application has been described as different, interesting, and appealing. The work of another student who selected a career in optical finishing technology was described by his employer as being technically excellent relative to lens design and manufacturing. By mutual agreement on the part of he and his employer, he is not involved in the lens-tinting aspects of the process.

Finally, it is important that all individuals who fail a color vision screening test be given "recourse" to additional testing to determine the exact type and degree of their color vision deficit as early in the educational process as possible. Some investigators have made recommendations for screening and other more diagnostic instruments which they feel are or are not appropriate for preschoolers and younger grade-level school children (Gallagher & Gallagher, 1964; Thurline, 1972; Alexander, 1975; Swanson & Everett, 1992).

Relative to adults, since 1984 the state of New York has allowed *recourse testing* for all police officer candidates who have failed the Ishihara Test (24-plate edition) during the color vision portion of their physical examinations. The Ishihara is such an efficient screening device that (at least for adults) it separates all color normals and color defectives (even those with the mildest color deficits) into two compact groups (Johnson, 1992a). Such testing conducted at NTID since 1984 on 109 police officer candidates has been successful in helping 102 of these young men (94.5%) resume their candidacy and has been a powerful aid in the prevention of job discrimination. More than 50% of these men were previously unaware that they had color deficient vision. Fortunately the color deficit of these young men was so mild that no job restrictions were deemed necessary.

To support this process, some authors have suggested appropriate color vision diagnostic batteries to aid in the acquisition of this information and highly recommend "differential diagnosis" where each test contributes additional information until an appropriate diagnosis is confirmed (Mossman & Young, 1983; Johnson, 1992a). It is recommended that this type of testing take place as early as feasible to support not only the educational and career selection processes, but to help in genetic counseling and prevent job discrimination.

In the preceding paragraphs, a variety of problems encountered by persons with color defective vision have been discussed along with recommendations by some authors for resolution of these problems. Unfortunately, a review of the literature failed to disclose any attempt to employ what appears to be a simple method of dealing with at least one of the problems: i.e., *color adaptation*. In 1951, Farnsworth presented his "Adjustable Iso-Color Diagram" to demonstrate what the color defective person sees (or doesn't see). Farnsworth's information has been employed successfully in the design of a variety of color vision screening and diagnostic instruments: i.e., the Ishihara Tests for Colour-Blindness (Ishihara, 1982) and other pseudoisochromatic (PIC) plate tests and The Farnsworth-Munsell 100-Hue Test (Farnsworth, 1957) to name a few. The following paragraphs show how Farnsworth's information can also be used to systematically adapt colors used in educational materials, computer programs, pictorial displays, and warning labels, signs, and signals to make them accessible and/or alleviate danger for most, if not all, persons with color defective vision.

Methodology

Suggested Method of Color (HUE) Adaptation

Munsell Color Notation System

In order to discuss the method of color (HUE) adaptation in a manner which will hopefully be both meaningful and understandable to the reader, it is first necessary to discuss the Munsell system of "Color Notation" as originally devised by the American artist A. H. Munsell and made accessible to the general public in 1905 (Munsell, 1981; Minolta, 1993). In devising his notation system, Munsell was striving to invent a means of describing colors and exactly define their characteristics and attributes in much the same manner and with the same preciseness and accuracy as that notation system which for several centuries had been available in the world of music.

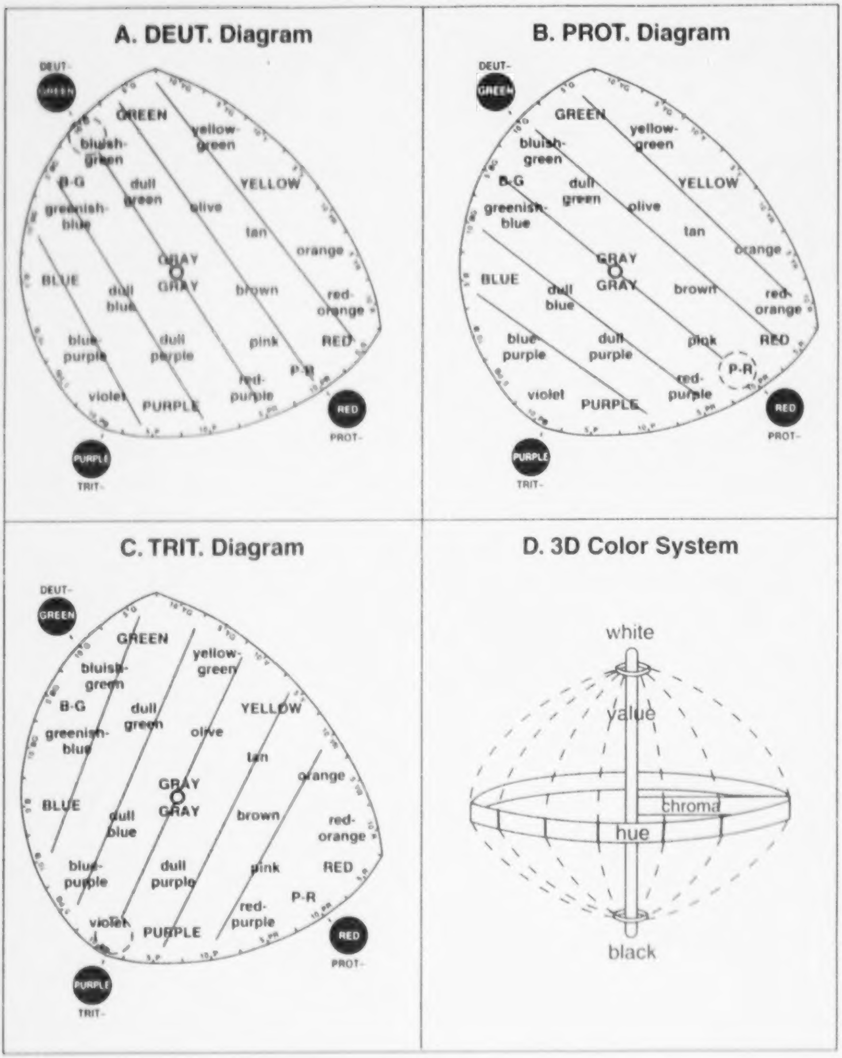
Although his system has since been updated to create the "Munsell Renotation System" which is currently in use (Minolta, 1993), it contains basically the same characteristics as originally described by Munsell. It is essentially a three dimensional system in which each of the dimensions can be measured separately. This sytem (H V/C) expresses numerically any given color in terms of its hue (H), value (V), and chroma (C) where hue expresses the name and number of a color, value is the lightness of that color, and chroma is the color strength. These three characteristics of color can be visually evaluated by referring to the Munsell Color Charts. However, a rather complete, but simplified demonstration of this system is available in the booklet "Precise Color Communication" (Minolta, 1993). [Note. A special piece of equipment referred to as a "Colorimeter" is now available to instantly measure numerically the exact hue, value, and chroma of an object or light source using Munsell's or one of the other currently accepted notation systems (Minolta, 1993).]

Since color graphics are not allowed in this article, it is necessary to describe the suggested color adaptation system in literary terms. Simplified versions of the three color dimensions are shown in Figure 4. In the figure, Diagram D shows *Munsell's 3D Color System* as adapted from Minolta (1987), and Diagrams A, B, and C are adapted from Farnsworth's (1951) *Adjustable Iso-Color Diagram*. By referring to Diagrams A through D, it should be possible to describe the important aspects of color notation.

Diagram D shows the three dimensions of color described by Munsell with Hue forming the outer rim or perimeter, value forming the vertical axis, and chroma the horizontal axis. The various hues are named in diagrams A, B, and C and are arranged according to the wavelength frequency, from high to low frequency, in a clockwise direction in that order presented earlier in figure 3: i.e., Red-Purple (highest frequency) to Purple (lowest frequency).

In other words, in these diagrams, the hues or colors are arranged in a *Hue Circle* according to their wavelength frequency. The *Principal Hues* are five in number and include Red (R), Yellow (Y), Green (G), Blue (B), and Purple (P) in order of descending frequency. These five colors were selected by Munsell as the principal hues because they are "visualluy" equidistant from each other in hue. The "Intermediate Hues" are those that are located visually at the mid-points of the five principal hues and include Red-Purple (RP), Yellow-Red (YR) or orange, Green-Yellow (GY), Blue-Green (BG), and Purple-Blue (PB). Together, these 10 hues make up what are referred to as the *Major Hues*. There are, of course, additional hues called *Second Intermediate Hues* which are again placed at visually determined midpoints between each of the ten major hues. Suffice it to say that they take the names of the colors found on either side of them in the visible color spectrum.

According to the Munsell system, values (on the vertical axis in Diagram D) are numbered from 1 (the blackest black) at the bottom through 9 (the whitest white) at the top with the various shades of gray (from black to white) in the middle. Finally, chroma, also referred to as *saturation* is that aspect of color which denotes its strength or weakness: i.e., it is



A. DEUT. Diagram

B. PROT. Diagram

C. TRIT. Diagram

D. 3D Color System

DEUT-
GREEN
RED
PROT-
PURPLE
TRIT-
GREEN
bluish-green
yellow-green
B-G
dull green
YELLOW
greenish-blue
olive
tan
orange
GRAY
BLUE
dull blue
brown
red-orange
blue-purple
dull purple
pink
RED
P-R
violet
PURPLE
red-purple
white
value
chroma
hue
black

Figure 4. *Schematic adaptations of Farnsworth's (1951) "Adjustable Iso-Color Diagram" (Diagrams A, B, & C) and Minolta's (1987) "3D Color System (Diagram D)."*

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the degree of departure of a color sensation from that of white or gray. For example, if one selects a hue of red from the hue circle and begins to add it to a selected value of gray as was done in Diagrams A, B, and C, depending on the original hue and value selected, it first becomes brown. With the addition of more red, it gradually begins to take on the visual attributes of a vivid, fully saturated red.

Likewise, if one begins with a selected hue of blue-green and adds it to the same value of gray, it may first become a dull green, and at "full saturation," will take on the attributes of the strongest or most vivid bluish-green possible depending on the gray value initially selected. This fully saturated hue is referred to as the *Home Value Level* or that value level at which the maximum chroma is reached for some particular hue. These examples should be apparent if one refers to Diagrams A, B, and C. Home value varies for different hues: i.e., for yellow, home value is reached at the eighth level, for green at the fifth level, and for purple-blue at the third level.

Color Confusion

In Farnsworth's Adjustable Iso-Color Diagrams shown in Diagrams A, B, and C, there are several items to note. First note the black circles labeled Green (Deut-), Red (Prot-), and Purple (Trit-). These circles are meant to connote the three types of color anomalies. Next note the dashed circles adjacent to one of the three black circles within each of the three diagrams. In Diagram A (the Deut. Diagram), the dashed circle is located adjacent to the black circle labeled green. In Diagram B (the Prot. Diagram), the dashed circle is located opposite the black circle labeled red. In Diagram C (the Trit. Diagram), the dashed circle is located adjacent to the black circle labeled purple. The various hues are all listed within the circle in that manner already mentioned above: i.e., the "hue circle." Finally, note the five lines located within the perimeter of each diagram. The direction of these lines varies depending on which of the black circles the dashed circle is located opposite.

The six white areas between lines within each diagram are referred to as *ZONES*. Persons with inherited color defective vision will only confuse colors (HUES) which are found in the same zone or on the same line: i.e., they may not see them as different colors. *They will never confuse two colors which lie across lines in two different zones.*

Using Diagram A as an example, the zones and lines contain the names of colors which the so-called "Green-Defective" (Deuteranomalous or Deutan) person will confuse. If the color defect is mild, the two colors will need to be close to each other in the same zone or on the same line for them not to be seen as two different colors. If the color defect is strong such as in dichromatism (complete absence of green cones), all the colors located within the same zone or on the same line will appear to be the same: i.e., will be confused or seen as the same color. For example, the dichromatic person will not see red-orange, orange, yellow, or yellow-green as different colors because they are all located in the same zone. Likewise, they will not see the difference between red, brown, tan, olive, and green. However, they would see yellow and blue as two different colors since they lie across lines in two different zones.

Note that the lines located within Diagrams A and B travel in a similar direction forming almost the same zones. Thus, red- and green-defective persons will have similar confusions—hence, the name "red-green defectives." The reason for this phenomenon is the tremendous amount of overlap in the red and green light absorption curves shown in Figure 3 above: i.e., the red and green cones respond to many lightwaves of the same frequency. As would be expected, the zones are completely different for the tritan or tritanomalous person because there is not much overlap of the blue with the green and red light absorption curves.

Using this information in a more practical manner, were one to design a warning sign using two different colors, if the figure or print were made of blue on a yellow background, it would be seen by everyone including the achromat who would see it in shades of black, white, and gray. This was the theory on which Farnsworth designed the Ishihara Tests for Colour-Blindness and other color vision screening and diagnostic instruments.

For example, in the Ishihara Test (24-plates edition), Plate 1 is the "Instruction Plate" and contains an orange "12" on a dull-blue background. No one makes an error on this plate since the two colors are from two different zones. Plate 9 is an "Invisible Number" plate with an orange "45" on a yellow-green background. Because both the figure and ground are made of colors located fairly close to one another within the same zone, often even the mild deuteranomalous (or protanomalous) trichromat will not see the number which is quite obvious to "color normals."

Color Adaptation Principles

Using the information contained in the above paragraphs in this section, the following recommendations should be considered when selecting colors for materials in which all of the information should be apparent to most, if not all, color deficient persons:

1. *To avoid color confusions, always observe the zone/line rule (Farnsworth, 1951) when making color selections.* That is, make certain that no colors in any figures are in the same zone or on the same line. Also, the color for each figure should differ from that found within the background. Using this technique, most mild and moderate color deficient persons will not only be able to see and discriminate the different colors, but will often be able to name them correctly even if the colors as they see them are not exactly the same as those viewed by the color normal. In addition, the monochromat or achromat will see the figures even if not in colors. For example, a yellow-green fish, a brown hat, and a blue star should be seen easily on a tan background.

2. *As a rule of thumb, use full saturation for all hues (the most vivid color possible for a given hue) for all figures.* While continuing to observe the zone/line rule, use fully saturated hues remembering that some of the colors are more vivid when they reach full saturation because they take more steps to reach their "home value."

3. *Use lines of demarcation as often as possible.* Placing well-defined boundaries around figures helps color defectives to see the figures even if they don't see the colors within the boundaries. Black is always good except in cases where it closely matches the color within the figure: i.e., black boundary and dark blue or brown figure color. It is especially good when using colors of high value (pastels) for the figure color.

4. *Use high contrast between figure and ground.* Contrast can be achieved by varying the values between figure and ground: i.e., a figure at full saturation from one of the mid-values (grays) with a background of high value (toward the whites) with partial or full saturation.

5. *Always afford enough environmental illumination when color defective persons are viewing materials.* Deuteranomalous trichromats do not have an inherent luminosity problem while protanomalous trichromats do: i.e., Prots cannot take advantage of the brightness or vividness within a hue at full saturation to determine its color. However, they can make use of a brightly lit environment to help discriminate the differences in colors. In general, color discrimination is best at moderate illumination levels. At low levels of illumination, discrimination deteriorates (Na-

tional Research Council, 1981). Most people find the glare at high sources of illumination uncomfortable, especially those with photophobia (glare problems).

6. *Field size is important.* The size of field of view is important in color discrimination. In general, anomalous trichromats and dichromats show improvement in color discrimination as the siza of field is enlarged (National Research Council, 1981).

7. *Continue to Teach Colors.* After identifying students with color defective vision, use color terms often (Wildmn, 1966): i.e., mild and moderate color defectives will learn to identify colors by name even though they may not be perceived exactly the same as by color normals. However, avoid test questions and teaching concepts based strictly on knowledge of color: i.e., circle the brown hat.

8. *It may not be possible to satisfy the color needs of persons with tritanism with these same general rules.* As mentioned, tritanism is a very rare hereditary color defect with an estimated frequency rate of between 1/13,000 and 1/65,000 (National Research Council, 1981). Persons with tritanism do not share most of the same problems as persons with red and green defective vision: i.e., generally only the low frequency purple and blue portions of the color spectrum are affected, while the mid- and high-frequency colors are intact. It is not the point of this article to advocate changes in color usage at the expense of any color defective person. However, some of the above rules (including the zone/line rule) may not satisfy the needs of those individuals with tritanism.

Discussion

Incidence of inherited color deficiency was discussed. In general, incidence differs according to method of ascertainment, country, culture, and other variables. In the United States the incidence most often quoted is 8% for men and 0.5% for women. In the NTID population of approximately 3000 deaf students entering NTID over a 10 year period, 4.1% had inherited color defective vision: this figure included 6.5% of all males and 0.8% of the females. Relative to the inheritance patterns for color defective vision, red-green defectiveness is an X-chromosome-linked recessive trait while tritanism (blue defectiveness), which is very rare, shows an autosomal dominant type of inheritance pattern.

There are many types and degrees of color deficient vision. Most color defectives, however, are mild to moderate in degree with the most severe types being relatively rare. Thus, the term "colorblindness" is most often a misnomer since most color defectives see many, if not all colors. Unfortunately, many physicians, employers, teachers, parents, persons trained to perform color vision screening, and often color defectives themselves are not aware of these facts. As a consequence, many color deficient school children become frustrated, develop poor self images, become "educationally retarded," and are often mislabeled as slow learners, mentally retarded, or learning disabled. Their counterparts, as adults, are often either not able to enter the career of their choice of suffer from job discrimination and/or underemployment.

A method for adapting colors to make them accessible to most, if not all, color deficient persons has been recommended within this paper. This method takes advantage of Farnsworth's (1951) "Color Confusion Diagrams" to help eliminate color confusions which prevent color deficient persons from taking full advantage of many types of educational and other types of materials which are currently being produced in our society on a daily basis. Unfortunately, this dilemma often places not only these persons, but those around them in danger of injury, or in the worse-case scenario, even death. The following recommendations may help eliminate these problems:

1. All school systems should make color vision screening an integral part of entrance evaluations for all students. This screening should take place preferably at the preschool, kindergarten, or first grade level. Once suspected, additional testing should be performed to determine the exact type and degree of the defect. Fortunately, once this information has been obtained, periodic reevaluations are not necessary since inherited color defective vision does not change in type or degree with age.

2. Educational institutions and industry in general should place pressure on publishing, pharmaceutical, computer manufacturing, and all other businesses developing materials and equipment for public use to consider utilizing the suggested color adaptation techniques for all of their products.

3. All educational programs which train students in the fine and applied arts should make the principles of color adaptation an integral part of their training programs.

4. All employers who consider the ability to make sensitive color judgments an important part of their employees job description should allow employees recourse to additional testing if they have been found through screening to be color deficient. This would allow determination of the exact type and degree of prospective employees' color defects prior to eliminating them as potential job candidates.

5. When using colors in the design of warning labels, signs, and signals, the suggested color adaptation system could prevent injuries and/or save the lives of both color deficient persons and their coworkers. For example: Dichromats do not see the difference between a yellow and red-orange flashing light, and also cannot tell the difference between red and green traffic lights. However, modification of the colors would allow most, if not all, color deficient persons to recognize the differences in these important signals.

Notes

I wish to thank S. Scott Searl, M.D. and Richard J. Seeger, M.D., ophthalmological consultants to the NTID Eye & Ear Clinic for many years, and who performed the many ophthalmological examinations which made many aspects of this study possible.

I would also like to express my appreciation to Ms. Kathryn B. Betters, clinic assistant, who helped with visual screening, data collection, and many other aspects of day-to-day clinical activities.

This material was produced through an agreement between the Rochester Institute of Technology (RIT) and the U.S. Department of Education.

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Children's Representation Systems in Drawing Three-dimensional Objects: A Review of Empirical Studies

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Abstract

This study reviews 34 empirical studies from 1967 to 1992 that researched children's drawing development in terms of representation of three-dimensional object(s) by observation. It was found that the studies fell into three categories: those which examined how children represent the spatial relationships within an object, those which looked at how children represent relationships between two objects, and those studies which examined both kinds of representation. This study analyzes the research strategies, stimuli, subjects, statistical strategies, and relative variables within the 34 studies reviewed. Further research is needed which makes use of stimuli in different forms, and which compares drawings from three-dimensional stimuli with those from two-dimensional stimuli depicting the same three-dimensional objects. Also, further research needs to make use of a broader range of subjects in terms of age.

Introduction

This study examined 34 articles in journals that study how children solve the problem of representing solid objects through drawing. Spatial organization is the most recent research movement in children's drawings (Strommen, 1988). It has focused on the representation strategies children use rather than subject matters or emotional expression. Even though spatial integration is an important aspect of children's drawings and considerable research has been done, there has been no systematic review of this field. The purpose of this study is to review a number of empirical studies. More specifically, this article analyzes and systematizes the stimuli, subjects, methods, and variables used in these studies. It also projects the future direction of research into spatial integration in children's drawings. The studies reviewed (covering a span of 26 years) show relationships between children's cognitive development and their strategies for transferring images of three-dimensional objects onto a two-dimensional surface. Two kinds of studies emerge. One kind of study emphasizes the strategies for representing a single object; the other examines occlusion of one object by another. This review categorizes the studies in three ways because some studies combined the above aspects: (1) representation of spatial relation within an object, (2) between two objects, and (3) both within an object and between objects.

Method

All studies concerning the terms of production and development related to spatial depth in children's drawings were selected from Psychological Abstracts from 1967 to 1992. The criterion for selection was the studies must involve copying three-dimensional objects onto a two-dimensional surface. Then the references of the articles were collected and screened. However, books are not included and some articles are not available. The available articles are organized in chronological order within the three categories (Table 1).

Table 1 summarizes the basic methodological characteristics of these 34 studies. Twenty-one studies were concerned with spatial relationships within an object; 11 studies looked at how children represented spatial relationships between two objects; and two studies involved both a single object and relations between objects. All of the studies

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used a drawing task, and 12 experiments used both a drawing task and a judging task, responding task, or arranging task to find the gap between children's knowledge of spatial integration and their skill in representing it on a two-dimensional plane surface. Nine studies did multiple experiments either to increase accuracy or to study different aspects of spatial representation and cognitive development. Only one "within an object" study used organic form as a stimulus (Smith & Fucigna, 1988) and one study used figure-like form (Willats, 1992). There were two longitudinal studies (Chen, Therkelsen, & Griffiths, 1984; Chen & Holman, 1989). While Light and MacIntosh (1980) studied both opaque and transparent stimuli, no independent study of spatial depth between two objects of transparent stimuli has been done. A sorting technique was the most frequently used process for analyzing data. Subjects generally ranged in age from five to seven, with six being the most common age. Frequency and Chi-square test were the most frequently used statistical treatments.

Theoretical Considerations

"Within an object" studies (cf. Table 1) focused on the representation of form and spatial representation within an object. These studies were concerned with how children represent the shapes, facets, angles, edges, structure, or facial patterns of objects. Drawing categories ranged from primitive to complex. That is, children might draw a solid object by showing a single face of the object or a general impression of the object, or by depicting multiple adjacent faces without evidence of spatial depth, or they might exhibit oblique projection or accurate perspective drawing. "Within an object" studies also included articles that studied how the function of an object or a stereotype of an object can influence children's representation (Bremner & Moore, 1984; Davis, 1983; Davis, 1984; Taylor & Bacharach, 1982).

"Between two objects" studies (cf. Table 1) focused on the representation of spatial relationships between two objects. These studied how children represent an array of stimuli from a fixed viewpoint especially with regard to depth. The researchers emphasized the successful depiction of an object which was behind another object as a criteria for developmental advancement (i.e., occlusion). The researchers defined two main categories: occlusion and non-occlusion. More specifically, the children either omitted part or all of the occluded object or they overlapped the two objects as if they were transparent in order to represent the feature of occlusion; the children also used a horizontal array or a vertical array of a complete object to represent occluded objects. The studies also investigated the discrepancy between children's perception of spatial integration and their strategies for representing two occluded three-dimensional objects on a sheet of paper. All of the judgment tasks except one were from these studies.

"Within and between objects" studies (cf. Table 1) focused on representation of both the projection system within an object and the occlusion of one object by others. In addition, the relationship between these two aspects was researched.

Approximately half of all the studies tried to relate findings to a theory. The most influential theory is Luquet's developmental theory that includes intellectual realism and visual realism stages (Piaget & Inhelder, 1956). Piaget and Inhelder relate intellectual realism and visual realism to Topological and Projective relationships (or Euclidean relationship). Both theories provide an important framework for many of the studies reviewed (Beyer & Nodine, 1985; Bremner & Batten, 1991; Bremner & Moore, 1984; Chen & Cook, 1984; Colbert & Taunton, 1988; Cox, 1981; Cox, 1986; Crook, 1984;

Table 1. Summary of Methodological Characteristics of Selected Studies of Spatial Depth in Children's Drawings

Study	Activity	Stimulus	Instrumentation	Subjects	Statistical treatment	Related variables
Within an object						
Lewis & Livson 1967	Drawing	1 cube, 1 cylinder, 1 pentagon, 1 pyramid	Rating	242 M, 223 F (G1–G6)	Mean, Correlation, Multiple correlation, Frequency	Age*, Different models*; Type of representation
Freeman & Janikoun 1972	a Drawing	Verbal instruction (including drawing a cup)	Sorting	12 5 yrs., 12 6 yrs., 12 7 yrs., 12 8 yrs., 12 9 yrs.	Frequency	Age*, Different tasks*; Type of representation w/handle & flower
	b Drawing	Shapes of rectangle, circle, triangle & oval				
	c Drawing	Mug w/invisible handle & visible flower on it				
Mitchelmore 1978	Drawing	1 cuboid, 1 cylinder, 1 square pyramid, 1 cube, 1 cone	Sorting, Parametric analysis	Jamaica 40 M, 40 F (7, 9, 11, 12, 14 yrs.)	ANOVA, Frequency, Cronbach's coefficient alpha, Correlation	Age*, Different models*, Draw by observation or not*; Type of representation
Mitchelmore 1980	Drawing	1 cuboid, 1 cylinder, 1 pyramid, 1 cube, 1 prism	Sorting, 2-D block design, Pacific design construction test	16 M, 16F (8, 10, 12, 14 yrs)	ANOVA, Scheffé test, Correlation	Age*, Different models*; Type of representation
Taylor & Bacharach 1982	1 Drawing	3 cups, 3 flower decals (in, on & beside)	Sorting	36 5 yrs., 36 8 yrs.	2-way ANOVA, Fisher's exact test, Frequency	Age*, Different array of models*; Type of representation
	2a Drawing	1 cup,	Sorting	40 5 yrs., 40 8 yrs.	3-way ANOVA, Fisher's exact test, Frequency	Age*, Handle in view or not*, Handle present or broken*, Different combination of models*; Type of representation
	2b Responding	1 cup with broken handle	Sorting, Recording			
Victoria 1982	Drawing	1 cube, 1 cube + small cube, 1 cube − small cube	Sorting	16 6 yrs., 16 8 yrs., 16 10 yrs., 16 12 yrs.	Frequency	Age*, Different models*; Type of representation
Davis 1983	1 Drawing	1 plain cup w/hidden handle (SC), 2 plain cups w/hidden & visible handles (PC)	Sorting	48 M, 48 F (32 4 yrs., 32 5 yrs., 32 6 yrs.)	McNemar test, Frequency	Age*, Different aspects of model* Single or paired models*, Sequence of drawing models*; Type of representation

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	2	Drawing	SC, PC, 1 sugar bowl (same as cup but w/o handle)	Sorting	16 M, 16 F (5 yrs.)	McNemar test, Frequency	Different sets of model*; Type of representation
	3	Drawing	SC, PC, 2 sugar bowls (w/ or w/o a black spot)	Sorting	18 M, 18F (5 yrs.)	McNemar test, Frequency	Different sets of model*; Type of representation
Davis 1984	1	Drawing	Single glass w/handle turned away, Paired glasses (handle turned away & visible handle)	Sorting	32 4 yrs., 32 5 yrs., 32 6 yrs.	McNemar test, Chi-square, Frequency	Age*, Different sets of model*; Type of representation
	2	Drawing	Single gaiss w/handle turned away, Milk, Paired glasses (handle turned away & visible handle)	Sorting	24 5 yrs., 24 6 yrs., 24 7 yrs.	McNemar test, Chi-square, Frequency	Age*, Different sets of model*; Type of representation
Bremner & Moore 1984	1	Drawing	1 off-white coffee mug w/ handle 1 blue block w/conical	Sorting	30 yrs., 30 6 yrs., 30 7 yrs. 28 6 yrs.	Chi-square, Frequency	Age*, Different models*, Different aspects of models*, Prior investigation or not* Naming before or after drawing*; Type of representation
	2	Drawing	1 off-white coffee mug w/a handle	Sorting		Chi-square, Frequency	
Chen 1984		Drawing	3-D models, photographs, 1 cylinder, 1 cone & 1 tetrahedron	Rating	Australia (6, 8 yrs.)	ANOVA, Binomial test	Age*, Practice effect*, photographs of models*; Type of presentation
Chen, Therkelsen, & Griffiths 1984		Drawing	3-D models, photographs & linedrawings of 1 cube & 1 cylinder	Rating	42 M, 38 F (20 6 yrs., 20 8 yrs., 40 10 yrs.)	3-way ANOVA, *t*-Test, Frequency, Scheffé test	Age*, Different models*, Time (longitudinal or control)*, 3-D models, drawings of models, or photographs of models*; Type of representation
Beyer & Nodine 1985		Drawing	3-D models & photographs of 1 cube, 1 pyramid & 1 cylinder represented from familiar/unfamiliar orientations × familiar/unfamiliar functions (total: 2 × 11 = 22)	Sorring	20 7 yrs., 20 9 yrs., 20 adults	3-way ANOVA, LSD test	Age*; Familiarity of orientation* Familiarity of function*; Type of representation
Lewis 1985		Drawing	1 plain cube, 1 designed cube	Sorting	265 M, 259 F (K, G1–G5)	*t*-test, Mean, Frequency	Age*, Sex*, Different models*; Type of representation
Cox 1986		Drawing	1 cube	Sorting	130 7 yrs., 129 12 yrs., 101 adults	Chi-square, Frequency	Age*, Different introductions*; Type of representation

Table 1. Continued

Study	Activity	Stimulus	Instrumentation	Subjects	Statistical treatment	Related variables
Deregowski & Strang 1986	Drawing	2 cubes, 1 square tube, 1 open box, 2 skeleton cubes, 2 incomplete wire cubes	Sorting	Scottish 48 5–6 yrs., 36 8–9 yrs., 36 10–11 yrs.	Chi-square, Frequency	Age*, Different models*; Type of representation
Moore 1986	Drawing	1 yellow cube, 1 cube w/faces painted	Sorting	30 7 yrs., 30 9 yrs.	Chi-square, Frequency	Age*; Type of representation, Correction of location of colors
Lee & Bremner 1987	Drawing	1 table	Sorting, Measuring	30 in each 4, 5, 6, 7, 8, 9, 10 yrs., 147 11 yrs., 178 12 yrs., 164 13 yrs., 90 14 yrs.	1-way ANOVA, Chi-square, Correlation, Frequency	Age*, Type of representation, Degree of convergence
Colbert & Taunton 1988	Drawing	1 cube w/triangular solid top (it has solid rectangles & black & white details)	Sorting	70 4 yrs, 70 8 yrs.	Frequency	Age*; Type of representation
Smith & Fucigna 1988	Drawing	1 green pepper	Rating	45 M, 59 F (K, 6, 8, 10, 11 yrs.)	Kruskal-Willis 1 way ANOVA, Chi-square, Frequency, Reliability	Age*, Drawing score of 4 systems
Nicholls & Kennedy 1992	Drawing	1 cube	Sorting	789 (4–15 yrs.) 945 adults	Correlation, Frequency, Mean, Kurtosis coefficient Quasi-independent test	Age*; Type of representation
Willats 1992	Drawing	1 wooden human-like figure constituted by geometric units	Sorting, Measuring	32 4 yrs., 32 7 yrs., 32 12 yrs. (16 M, 16 F in each age group)	Binomial test, Frequency, Mean, *t*-Test, Fisher's exact probability test Chi-square	Age*, Different features of the model*, Different orientations of the features*; Type of representation, Ratio of length/width, Use of different drawing systems

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Between two objects						
Cox 1978	a Judging	2 balls (blue & red)	Sorting	55 5 yrs., 35 6 yrs., 40 7 yrs.	Chi-square, z of chi-square, Frequency	Age*, Different instructions*; Colors and balls identification, Type of representation, Picture selection
	b Drawing	2 balls (blue & red)	Sorting			
	c Judging	A picture of the 2 balls (one above the other)	Sorting			
Light & Macintosh 1980	Drawing	2 opaque plastic funnels (blue & red) 2 transparent glass beakers, 2 houses	Sorting	64 (6 yrs.)	McNemar test, Frequency, Fisher's exact probability test	Different sets of models*, Different arrays of models*; Type of representation
Cox	1 Drawing	2 plastic funnels (red & yellow)	Sorting	29 M, 29 F (5 yrs.)	Frequency, z-test	Age*, Different array*; Type of representation
	2 Drawing	2 balls (red & blue)	Sorting	256 (4–10 yrs. & adults)	Frequency, z-test, Kendall's S coefficient of correlation	Age*; Type of representation
	3a Drawing	2 balls (red & blue)	Sorting	34 4 yrs., 38 6 yrs., 38 8 yrs., 37 10 yrs., 40 adults	Binomail test, z-test	Age*; Type of representation
	3b Judging	2 pictures of the task (above & occluded)	Sorting			Picture selection, Relation of selection & drawing
	4a Drawing 4b Arranging	2 balls (red & blue), 2 discs (red & blue)	Sorting	32 5 yrs., 16 6 yrs., 32 7 yrs., 16 8 yrs., 32 9 yrs.	Frequency, z-test, Kendall's S coefficient of correlation	Age*; Type of representation, Type of arrangement
	5a Drawing	1 toy wall 1 toy robber 1 toy policeman	Sorting	26 4 yrs., 25 6 yrs., 28 8 yrs., 27 10 yrs., 28 adults	Frequency, z-test, Fisher's exact probability test	Age*, Role playing*; Type of representation
	5b Judging	3 types of pictures of representation	Sorting			Picture selection
Light & Humphreys 1981	Drawing	2 ceramic pigs (red & green) 2 blocks	Sorting	35 5 yrs., 32 6 yrs., 30 7 yrs.	Chi-square, Frequency	Age*, Different pairs of model*, Different array of models*; Type of representation
Light & Simmons 1983	1a Drawing	2 balls (red & blue)	Sorting Observation	61 6 yrs., 57 8 yrs., 58 9 yrs.	Frequency, Chi-square, Fisher's exact probability test	Age*, Communication expectation*; Type of representation
	1b Judging	3 pictures of the 2 balls (horizontal, vertical & occluded)				Age*, Different pictures*; Viewpoint selection

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Table 1. Continued

Study	Activity	Stimulus	Instrumentation	Subjects	Statistical treatment	Related variables
Light & Simmons cont.	2a Drawing	2 same size of balls	Observation	60 6 yrs.	Frequency	Communication expectation*, Different aspects*; Type of representation
	2b Judging	Drawings of the subjects	Sorting			Different pictures*; Chair selection
Crook 1984	1a Responding 1b Drawing	1 ball, 2 sticks 1 pair of sticks	Sorting	54 5 yrs., 54 6 yrs., 54 7 yrs.	Chi-square, Fisher's exact test, Frequency	Age*, Color & combination of models*, Subject's prior manipulation*; Type of representation
	2a Responding	1 ball, 1 stick	Sorting	75 5 yrs.	Chi-square	Color & combination of models*, Subject's prior manipulation*; Type of representation
	2b Drawing	1 pair of sticks				
	3a Responding 3b Drawing	1 ball 3 sticks	Sorting	32 5 yrs.	Frequency	Color of models*, Subject's prior manipulation*; Type of representation
Light & Foot 1986	1 Drawing	1 toy wall, 1 toy man, & 1 toy column	Sorting	90 (6 yrs.)	Frequency	Different combinations of introductions & models*; Type of representation
	2 Drawing	2 toy columns, 2 toy walls	Sorting	90 (6 yrs.)	Chi-square, Frequency	Different combinations of introductions & models*; Type of representation
	3 Drawing	2 toy columns, 2 toy walls, Pencils, Colored pens	Sorting	120 (6 yrs.)	Chi-square, Frequency	Different combinations of models & drawing media*; Type of representation
Smith & Campbell 1987	a Drawing	2 balls of same size	Sorting	273 (4–11 yrs.)	ANOVA, Chi-square, Frequency	Age*, Different aspects*, Expectation of communication*; Type of representation
	b Judging	6 drawings of the stimuli				Age, Different pictures*; Viewpoint selection
Ingram & Butterworth 1989	1 Drawing	2 blocks of different sizes consist 4 arrays	Sorting	30 M, 30 F (3–7 yrs.)	Jonckheere trend test, Frequency, McNemar test	Age*, Different array of models*; Type of representation
	2 Drawing	2 blocks of different sizes consist 3 arrays	Sorting	60 (3–7 yrs.)	Jonckheere trend test, Frequency, McNemar test	Age*, Different array of models*; Type of representation

Su 1991	a Drawing	1 puppet robber/man, puppet policeman, 1 puppet child, 1 model wall, 1 model bus, 1 Lego construction tower	Sorting	32 4 yrs., 32 5 yrs., 32 6 yrs.	Chi-square, Frequency	Age*, 4 tasks of role play and different combination of models*; Type of representation, Drawing sequence
	b Judging	5 pictures of representation				Picture selection
Chen & Holman 1989	Drawing	2 identical cups w/a handle 2 sets of 2 color balls	Sorting	113 5 yrs., 129 6 yrs., 147 7 yrs., (Control group: 53 7 yrs., 54 8 yrs., 50 9 yrs.)	Frequency, Chi-square	Age*, Time (longitudinal)*; Different aspects*; Different combinations of models, Type of representation, Different or same, Improvement of drawing
Within and between objects						
Willats 1977	Drawing	1 radio, 1 box, 1 saucepan, 1 table	Sorting Measuring	54 M, 54 F (5–17 yrs)	Frequency, Correlation	Age*; Drawing time, Overlap index, Overlap score Type of representation
Bremner & Batten 1991	Drawing	3 cubes (an L-shape array & in 3 viewing conditions)	Sorting	45 6 yrs., 45 8 yrs., 45 10 yrs., 45 12 yrs., 45 14 yrs.	Chi-square, Frequency, Corrected probability	Age*, Different viewpoints*; Type of representation used within and between cubes

Note: Related variables include independent variables and dependent variables (* = independent variable).
Note: If researcher uses only the denotation of "× 2" in the context, we assume the statistical treatment is Chi-square.
Note: This table provides only selected information in each article. A little information is not shown because it is not available in the article.

Freeman & Janikoun, 1972; Ingram & Butterworth, 1989; Mitchelmore, 1980; Nicholls & Kennedy, 1992; Taylor & Bacharach, 1982; Willats, 1977; Willats, 1992). However, some researchers have disputed this theory. Mitchelmore (1980) suggests that intellectual realism and visual realism might be a misleading description of the results of his study. Some other studies found that the transition from intellectual realism to visual realism occurred earlier than age eight or nine (e.g., Bremner & Moore, 1984; Ingram & Butterworth, 1989). Another relevant theory is Barrett and Light's (1976) three stages of children's drawing: symbolism, intellectual realism, and visual realism (Bremner & Moore, 1984; Colbert & Taunton, 1988; Taylor & Bacharach, 1982). A few studies cited Gibson (1950) who proposes another theory which speaks of the developmental stages of children's drawing in terms of visual world and visual field (Light & MacIntosh, 1980; Light & Humphreys, 1981; Moore, 1986; Willats, 1992). Light and his colleagues theory of perception and representation, which uses the terms array specific and visual specific (Light & Simmons, 1983; Light & Humphreys, 1981), has had broad influence, too (Bremner & Moore, 1984; Colbert & Taunton, 1988; Davis, 1983; Davis, 1984; Ingram & Butterworth, 1989; Moore, 1986; Crook, 1984; Smith & Campbell, 1987). Other theories that have contributed to these studies are Gombrich's (1960) view advanced theory (Mitchelmore, 1978), Gibson's (1971) point projection theory (Willats, 1977), Gibson's (1979) concept of perception (Beyer & Nodine, 1985; Bremner & Moore, 1984), Piaget & Inhelder's concrete operational stage of cognitive development theory (Willats, 1977), Marr's (1982) theory of object-centered and viewer-centered descriptions (Chen & Holman, 1989; Nicholls & Kennedy, 1992; Victoria, 1982; Willats, 1992), and Lowenfeld and Brittain's (1966) stages of development from preschematic, through schematic and prerealistic to realistic (Mitchelmore, 1978; Mitchelmore, 1980).

However, the rest of the studies did not make any concentrated effort to connect content to a theory directly. While the studies have some limited agreement with earlier findings, we suggest that studies should be build upon previous theories. All the classical developmental sequence of stages theories should be connected with studies in this field. Indeed, all theories regarding the relationship of perception to representation may be useful in developing a theory-based research.

Some principles in children's drawing express different tactics of representation in their artistic development. A few studies connect their results with principles such as "canonical representation" (Bremner & Moore, 1984; Chen & Holman, 1989; Davis, 1983; Davis 1984; Light & Foot, 1986; Light & Simmons, 1983; Taylor & Bacharach, 1982), "stereotype" (Freeman & Janikoun, 1972; Light & Simmons, 1983; Taylor & Bacharach, 1982; Victoria, 1982; Willats, 1977), "perpendicular error" (Cox, 1986), "transparency" (Crook, 1984; Freeman & Janikoun, 1972), and "hidden line elimination" (Chen & Holman, 1989; Crook, 1984; Ingram & Butterworth, 1989; Light & Simmons, 1983).

The concept of canonical representation was derived from intellectual realism. It suggests that children can draw visual stimuli much more sensitively than it appears, because they extract the "structural core" of the model although they forget to transform it sufficiently when they begin to draw (Freeman, 1980). The concept of stereotyped representation suggests that children work with some "formula" for the topic they are drawing (Freeman, 1980). The perpendicular principle explains such graphic phenomenon as a cube which is represented as an unfolded box with its surfaces standing at right angles to each other. The application of this principle explains how the need for visual order overpowers many of the child's perceptions of the natural world (Wilson & Wilson, 1982). Other "within an object" studies that have focused on representation of form itself as well as spatial representation can be connected with the perpendicular principle. The concept of transparent representation is also derived from intellectual realism, and apparently violates visual realism (Freeman, 1980). Hidden line elimination (HLE) describes the hidden line portion of an object which is eliminated when two or more objects overlap. The transparency principle emerges when young children represent two overlapping objects as transparent instead of using HLE. Other "between two objects" studies that have focused on the representation of spatial relationships between two objects can be applied to the transparency and HLE principles.

Methodological Issues

Stimulus Properties

The studies of spatial depth in children's drawings used various stimuli. Many of the "within an object" studies, which were concerned with form itself and spatial representation within form, used stimuli of various shapes (cube, cuboid, pyramid, prism, pentagon, cylinder, cone, cube minus small cube, cube plus small cube and so on) to assure accuracy and generalizability in the results. They also explored the relationship between children's representations of different stimuli. Only one study used an organic form (Smith & Fucigna, 1988), and one (Willats, 1992) study used figure-like form as stimulus. Most stimuli were basic abstract forms. The studies of how conventional concept influence representation used a cup, a mug, a glass or bowl with a/an visible/invisible handle and/or a painted flower, a decal flower, or a spot. However, only two studies used a variety of stimuli, including a still life, a photograph, and a line drawing of a geometric object (Chen & Cook, 1984; Chen, Therkelsen, & Griffiths, 1984).

The "between two objects" studies focused on the spatial relationship between two objects, but not on relationships within a single object. The forms of stimuli in these studies are more varied than those in the first kind of study. Simple geometric objects (e.g., discs, blocks, balls) and representative objects (e.g., animals, human models) served as stimuli. Unlike the "within an object" studies, these studies treat the color of the object as a characteristic of the stimulus. Many experiments chose different bright colors for the paired objects. Especially when the researcher wanted to connect the array of real objects in the drawing task with the represented object in the judgment task, objects in different colors were easier to identify.

Only two studies examined children's representation of both single and multiple objects. Therefore, generalization is difficult. Moreover, these two studies were conducted differently. Willats' (1977) study used many stimuli and asked subjects to draw all objects from the same viewpoint. Bremner and Batten (1991) used three similar cubes in an L-shaped arrangement, but asked different subjects to draw them from three different viewpoints.

Not all the studies tell readers how they control the instruction and how they change the instruction for subjects of different ages. The quality of instruction or level of instruction in a study can affect the drawing outcome (Smith & Campbell, 1987). Moreover, as Cox pointed out (1981), older children may learn what an instruction actually means while younger children may not, even though they received the same instruction.

Variables

Table 1 shows that age was the fundamental independent variable. The subjects most often ranged between five to seven years of age, falling within the preschematic stage of four to seven years (Lowenfeld & Brittain, 1966) or the preoperational stage of two to seven years (Piaget & Inhelder, 1969). However, some studies (Light & MacIntosh, 1980; Cox, 1981, experiment 1; Davis, 1983, experiment 2 & 3; Light & Simmons, 1983, experiment 2; Bremner & Moore, 1984, experiment 2; Crook, 1984, experiment 2 & 3; Light & Foot, 1986) used only one age group and did not deal with the developmental process. Additional independent variables included different model colors, introductions, model arrays, viewpoints, communication demand, role playing, and gender. The basic dependent variable was the type of representation. In the "within an object" studies, most researchers suggested a series of categories from primitive to advanced form (e.g., Nicholls & Kennedy, 1992) or a simple yes/no discrimination (e.g., Davis, 1984). In the "between two objects" studies, there are two main categories: occlusion (united, transparent, and partial occlusion) and non-occlusion (vertical array, and horizontal array).

Experimental Control and Precision of Measurement

The majority of the studies had subjects participate in the experiment individually in order to ensure that all subjects observed the stimuli from the same viewpoint or to eliminate interaction among subjects. However, some studies in Table 1 conducted the experiment as a group rather than individually (Lewis, 1985; Lewis & Livson, 1967; Smith & Fucigna, 1988). This might distort the results somewhat because young children tend to look at or copy from their peer's drawings. Other studies failed to mention whether experiments were conducted individually or in groups; nor was this clear from the context (e.g., Chen, Therkelsen, & Griffiths, 1984; Cox, 1986; Light & Foot, 1986).

Sorting was the most used instrument of the studies in Table 1. When experimenters sorted the drawings the children produced, they had no single standard for categorizing children's drawing systems. For example, the number of categories for drawing a cube ranged from 4 (Lewis & Livson, 1967; Mitchelmore, 1978; Mitchelmore, 1980) to 13 (Cox, 1986). On the one hand, human error might have occurred during the process of categorization because it is difficult to be perfectly consistent in judgment. On the other hand, sorting the drawings could be biased by the experimenter's subjective judgment. Interreliability for sorting tasks can be measured and quantified using statistical methods of correlation. The reliability of the experiment would increase if drawings are analyzed repeatedly by the experimenter or analyzed by more than one judge so that the correlation of the measurements can be compared. Not all the drawings could be easily categorized into the experimenter's category system. When the drawing was not typical in terms of its characteristics, the judges had to decide which category the drawing belonged to. Therefore, the judges who sorted or rated the drawings played a more important role in the study than those who grade an ordinary paper-pencil test. In many studies, agreement was achieved from more than one judge, but some studies did not even mention how and by whom the drawings were sorted or rated.

Generalizability Over Subjects

While some of the experiments used random sampling methods or random assignments to increase reliability and validity, many experiments did not mention either how or where they gathered their subjects or how they assigned the subjects to different groups. Only a few studies directly informed the reader about measures of reliability and validity. Moreover, many studies did not tell the reader whether the experiments were controlled by manipulation, by holding conditions constant, or by balancing. Therefore, reliability and validity in those studies decreased. Due to these factors it is difficult for readers to generalize from the findings and to know to which population the findings can be generalized. Consequently, the later researchers sometimes did not have enough information to improve the studies.

Conclusion

Research on children's representational drawing has spanned several decades and has yielded valuable information. The most common method used to study the strategies children develop to draw a real life object is to have them draw one or two provided objects and then analyze the drawings directly. Some researchers also compared subjects' judgment of a correct drawing with their own drawings to investigate the discrepancy between perception and representation. As has been reviewed in this article, three main aspects were examined: (1) how children depict features within a single object, (2) how children depict features between two objects when they encounter a conflict between perception and representation, and (3) a combination of the above aspects. Although no standard scoring system or set of categories was used, there is a general agreement about the positive correlation between age and advancement in drawing. Factors such as viewpoint, colors or patterns of objects, shapes of objects, the subject's desire to communicate, the context of an object, the subject's learning experience, etc., are reported as possible independent variables of drawing performance.

A number of limitations in these studies may be noted. First, the stimuli were limited in terms of form. Research into visual representation needs to expand its scope to include more forms from everyday life. In the "within an object" studies, different kinds of geometric forms, especially the cube, were the main objects used by the researchers. Everyday stimuli were rarely used. The results gave a profile of developmental tendencies and potential variables in different domains. However, there are other visual forms besides geometric objects. The variables and the drawing strategies used to represent forms other than geometric ones would not be the same.

The "between two objects" studies and "within and between objects" studies did not compare drawings from three-dimensional stimuli with drawings from two-dimensional stimuli (e.g., photographs, slides, or drawings) depicting the same three-dimensional stimuli. Although the task of judging pictures was often used to determine what picture matched the children's retinal image, it functioned differently from the task of drawing two-dimensional stimuli. The judgment task provided an opportunity to look at the technical and conceptual difficulties that arise during the process of transferring a solid model onto a pictorial surface but did not provide insight into the process of transferring a two-dimensional model onto a pictorial surface. Therefore, in "between two objects" studies and "within and between objects" studies, comparisons between drawings from three-dimensional models and drawings from two-dimensional pictures of the depicted models might have provided us with a greater understanding of children's representation.

Second, some articles do not provide sufficient information. In general, researchers should provide the readers with sufficient information about the subjects used in their studies. Many of the studies reviewed do not provide necessary information about the sampling process, nor do they discuss the sex, cultural characteristics, economic status, and educational status of their subjects. All of the above are factors which could result in different performance. Without this information, questions arise when comparing the results of relevant studies.

Likewise, crucial experiment controls should be reported in order to establish the reliability and validity of the experiment.

Third, many researchers seem to assume that, because their samples are from the same culture, the cultural characteristics of the subjects and their relevant learning experiences are undifferentiated and, therefore, unimportant. As far as the researchers are concerned, the development procedure is innate and universal. However, does culture and learning experience not influence performance at all? For example, it would be important to know whether the art teacher or parents had already taught the knowledge or technique of perspective or if the subjects had learned how to draw a geometric model from their mathematics class, etc. Some studies found evidence that subjects who had learned representational strategies from drawings of photographs were better able to map out the retinal image of a solid model. In addition, cultural differences may play a role in choosing or learning the strategy of representation. For example, some cultures may have a specific way of drawing something while other cultures may rarely use certain strategies. Occasionally, there is a study in which the above aspects have been examined or reported, but research into the linkage between culture and representational strategies is still limited and has not yet yielded systematic findings. Cross-cultural studies can be done to generalize the findings in one culture.

Fourth, although most of the studies used frequency and Chi-square as statistical method, quite a few of the studies used ANOVA. According to the characteristics of ANOVA, continuous scales of criterion are required to use it. Using ANOVA to analyze children's observational drawing might be inappropriate because measurement of drawing features is sometimes categorical not continuous data. Researchers who will use ANOVA in this specific area should keep cautious.

Lastly, some age ranges were seldom studied. Although most studies agree on a general development of representation, the "within an object" studies disagree as to the path children take from the beginning to the final drawing stages; moreover, they dispute what the final stage should be. Research to date has focused primarily on subjects ranging from five to seven years of age. Only five studies examined the performance of subjects between ages 11 and 17. It is suggested that besides early and middle childhood, research in late childhood and adolescence is also important and should be done systematically. This will help us develop a more solid understanding of human development in terms of perception and visual representation.

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An Examination of Untutored Thematic and Observational Drawings Made by Third- and Seventh-Grade Students

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Abstract

While nine states in this nation either mandate of voluntarily provide certified elementary art specialists, many students in grades K–6 do not receive art instruction by certified art teachers. This developmental-type study compares untutored thematic and observational drawings made by third-grade ($n = 45$) and seventh-grade students ($n = 36$) to determine if a lack of formal art instruction affects the aesthetic quality of student children's artistic development. Art instruction is not a controlled independent variable, but an overall factor because 84 percent of all students had no art instruction in school.

A three-factor ANOVA shows a main effect grade difference on both drawing tasks and a main effect previous experience with art factor on the thematic drawing. However, no 2-way or 3-way interactions were found for either drawing. Gender was not a statistically significant factor, but descriptive comparisons on the thematic drawing showed smaller female mean differences between grade levels and a shift from a superior mean score in third-grade to a lower score in seventh-grade for females.

The National Art Education Association reports that 18 percent of the states in this country either require or voluntarily provide elementary art specialists for all or most K–6 students. Those states are Delaware, Iowa, Maine, Missouri, New Hampshire, New York, North Carolina, South Carolina, and Wisconsin. However, in some states, such as Arkansas, as few as 21 percent of elementary schools have art specialists, and classroom teachers are primarily responsible for art instruction.

Efland (1990) also reports that in 1979 the percentage of art specialists in elementary schools was about 18 percent. This figure was down from a 1963 report that indicated some 25 percent of elementary schools had the service of art specialists.

In a national survey that examined the status of arts education in American public schools, Charles Leonhard (1991, p. 13) reports that "art specialists are dominant in the teaching of art" in small (58.5%) and large (61.3%) elementary schools. He also says that classroom teachers teach art in 24.6 percent of the small and 27.4 percent of the large elementary schools in the United States. This figure varies greatly from the two previous reports and these robust percentages might be attributed to a small sample size and reporting trends.

Whatever the numbers on certified elementary art specialists may actually be, the issue of art in elementary education is an old one for us in art education. This research grew out of a concern over the lack of formal art instruction for students in grades K–6. This concern was put in a different perspective in 1991 by Renee James who observed that many of the seventh-grade students entering her art classes without formal art instruction composed drawings that she felt were underdeveloped and stereotyped. In this study, children's drawings are considered to be conceptual and perceptual indicators of student learning, growth, and development.

The purpose of this study of children's artistic development is to determine if a lack of formal elementary art instruction affects the aesthetic quality of untutored thematic and observational drawings made by two selected groups of third- and seventh-grade students. Each of two untutored drawing tasks are compared according to the factors of grade (3rd

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and 7th), gender, and previous experience with art.

Art instruction in this study is not a controlled independent variable, but is an overall factor because 84 percent of students had never received formal elementary art instruction. Therefore, the drawings in this study are not the result of an instructional strategy, but were one-time experimental tasks. Also, for the purpose of this study, it is important to distinguish between formal art instruction (given in grades K-6 by certified art teachers) and previous experience in art (demographic information from students about their past art exposure).

Related Research

Throughout the recent literature on art education, writers have given many reasons why formal art instruction should be included as an integral part of every child's elementary education. Howard Gardner (1982) contends that by the time children reach elementary schools, they crave knowledge of how to do things such as play the piano or render a drawing of a building in perspective. Teachers should be able to instruct and present models of how to do such things because it becomes crucial to achieve competence by the time students reach adolescence. If their own art works fall too far below observed standards of peers and adults, adolescences are likely to totally cease their artistic activity. Therefore our teaching efforts during the preadolescent period become extremely important. Sufficient learning progress should be made so when the older child gains personal critical awareness, his or her works will not seem so inadequate that the student quits in despair.

Arnheim (1986) compares stimulation with perceptual challenge, in which an outside situation confronts people in such a way as to enhance their capacities to grasp, interpret, unravel, and improve. He suggests that what people need is not more shapeless, mysterious, unrelated sensations, but instead more perceptual challenge. Arnheim believes that good thinking involves perception, and it follows that the perceptual abilities of the students and teachers must be explicitly cultivated in all areas of learning. It follows that art education could play a central role in the curriculum of a good school or university, but the way art educators describe their function often falls far short of making a convincing case. In a tongue-in-cheek manner, Arnheim states that, "We are told that the arts are needed to create a well-rounded person, although it is not obvious that being well-rounded is better than being slim" (p. 146). He believes that it is rarely made evident or understandable to public school administrators and policy-makers that drawing, painting, and sculpture, properly conceived, pose cognitive problems every bit as challenging as those found in mathematics or scientific education.

In regard to the selection of third- and seventh-grade students for this study, Lowenfeld and Brittain in the 1964 and 1986 editions of *Creative and Mental Growth* suggest that within any classroom a large range of individual physical and intellectual levels may be found. In looking at the drawings by children in the third grade, we can expect to find a wide range of differences. Third-graders' drawings and paintings may reflect a range in ability from that typical of a first-grader to that of a fifth-grader. Within a fifth-grade class, ability levels may range from those typical of third grade to those of seventh grade. Lowenfeld believes we have come to expect the child who is more developed intellectually to be in general more developed physically, and because art is a reflection of a child's total development, we can expect artistic achievements to follow the same general pattern. With a broader purpose, Lowenfeld and Brittain (1970) say that children's drawings reveal their makers' total knowledge, understanding, and interest in the world around them: Their drawings are the "language of thought" (p. 6).

Research in art education has systematically examined children's drawings for trends in the nature of perception and the effect of perceptual training (Salome, 1991), the effect of various types of instruction (Neperud, 1966), and age and developmental differences in student art work (Brittain, 1968; Uhlin, 1962). Since most students in this study receive no formal art instruction it is important to provide a brief review of research that speaks to the benefits of such instruction and to report on studies that examine the factors of gender and previous art experience.

In the NAEA publication *Translations*, Salome (1991) presents some general research findings about children's representational drawings. He concludes that certain kinds of perceptual training, representational copying, and practice can improve the drawings of children. Further, he states that drawings are important because they seem to offer other educational benefits such as improved perceptual discrimination, lasting memory of objects, and the development of mental imagery.

Neperud (1966) conducted a study that investigates how instruction in the visual elements using three teaching methods (teacher-centered, cooperative, and child-centered) affected children's graphic representations. Some 1,068 thematic drawings from 178 children were rated using a researcher-designed instrument based on eight visual element characteristics. It was found that fifth-grade females were rated significantly higher than males on the drawing task that employed teacher-centered instruction in the visual elements. This study supports the idea that aspects of art can be learned, developed, and encouraged by instruction.

Uhlin (1962) undertook a developmental study with 143 students ages 12, 13, and 14. Uhlin's purpose was to discover if a relationship exists between physical development and artistic expression. A Gestalt or total judgment rating procedure was used that considers the whole composition and not its separate and discrete elements. The statistical analysis of this raring process indicated that, in general terms, adolescent boys produce lower-quality two-dimensional art work than girls, boys are more rigid and nonlinear in their art products, and boys express significantly more humor.

Another developmental study was conducted by Brittain (1968) to determine if there is an art form that is distinct and expressive for students ages 12 to 15. Through basic observations and questioning the author found that the pencil seemed to be a favorite means of expression even when numerous other art materials were available. An experience factor was also discovered, in that a few of the children involved in these classes had art lessons beyond the usual art offered in the public schools. However, no difference could be seen in the artworks produced by those who had art lessons and those who did not.

Also, Brewer and Colbert (1992) found that for seventh-grade students, neither gender nor previous experience in art were significant factors. They used three treatment groups (studio, historical/critical, and questioning), two forms of product analysis (holistic and analytical) to rate student art work, and one art knowledge test. They found that across these variables, student achievement was not affected by gender or previous experience.

In pursuit of this study, the researcher hoped to discover whether there were significant differences between untutored thematic drawings made by third- and seventh-grade students, or if there were significant differences between observational drawings made by the same third- and seventh-grade students. If significant differences were not found on either or both drawings and students in the two grades achieved at approximately the same level, some documentation would exist about how the lack of formal art instruction may affect learning for students in grades K–6. And further, based on the review of literature, this study reexamines and addresses the factors of gender differences and the effect of previous art experience on student art performance.

Design

Subjects

The subjects in this study were two intact classes of third-grade students (n = 45) and two intact classes of seventh-grade students (n = 36). The gender ratio for the third-grade class was females (n = 21) and males (n = 24) and for the seventh-grade, females (n = 17) and males (n = 19).

The schools and students were selected because culturally, economically, and academically they represent a cross-section of the general population. The schools are located in a middle class suburb of a major metropolitan city in the mid-South. The two schools are in the same district and near each other.

Another determining factor for selecting the schools in this district was the certainty that 84% of the students in the elementary school had not had formal art instruction by a certified art specialist and that the seventh-grade students had entered with little or no art experience. This assumption was supported by the fact that only 14 of 85 students (16%) said they had ever had art in school. The seventh-graders were starting their first day of art, so they had no instruction prior to our experimental procedures. Both third-grade classroom teachers said they had not done any drawing assignments with their students.

Method

This study is developmental in nature in that it examines the existing level of knowledge and skills for two different age groups. But instead of simply analyzing the compositional differences and reporting them, an attempt is made to determine what effect a lack of formal art instruction may have on elementary students. In this case, the researcher decided to use fifth-grade students as the mean population and to test for significant differences between third- and seventh-grade groups on two drawing tasks, gender, and previous art experience.

Procedures

Over four days, the same experimental conditions and sequence of drawing tasks were given to two seventh-grade classes and then to two third-grade classes.

Session 1: The following instructions for the untutored thematic drawing were first given to two seventh-grade classes and at a later date to two third-grade classes.

> For the rest of the period we would like for you to make a drawing of a place you visited during this past summer. Think back: Where did you go last summer? It can be your favorite place, a place you like very much, or a place you would like to go back to. It can be any place.
>
> Make a drawing of that place. But, we would also like for you to include at least one person in the drawing. It can be you, a friend, or a group of people, but at least one person must appear in your drawing. We want you to work for the rest of the period (45 minutes). Use the entire paper to make your drawings. Make the best drawing you can.

At the end of each class period, the seventh-grade and the third-grade students answered two demographic questions on the back of their drawings. This first question was, "Before this class today, when was your last art class?" If students had not had a previous art class they were instructed to write a zero, but if they had, they were to write the grade and the school. The second question was, "Do you do art work at home?" If students did not, they were to write a zero, but if they answered yes, they were to describe what they did. The students were also asked to write a brief description of the place they composed in their thematic drawing.

Session 2: Each class was given instructions for the untutored observational drawing of a still-life. The still-life arrangement consisted of seven objects with very simple shapes. The instructions went as follows:

> For the rest of the period (45 minutes) we would like for you to make one drawing of all the objects you see placed on the table. Look carefully at the objects and try to draw them to the best of your ability. We want you to work for the rest of the period. Use the entire paper to make your drawings. Make the best drawing you can.

At the end of each period the students were asked to sign their drawing and the works were collected.

Assessment Procedures

The Gestalt Holistic Assessment (GHA) was developed in 1983 by the Educational Testing Service was used previously by Brewer (1991) and Brewer and Colbert (1992). The GHA has produced high interjudge reliability ratings and is sensitive to differences in student achievement.

All drawings collected in the study were individually coded and randomly ordered by drawing task (thematic and observational) and not by grade level. Judges viewed and rated the actual drawings not slide reproductions.

The four volunteer judges in this study were graduate students in art education with past elementary art teaching experience. They were told that all drawings were produced by fifth-grade students. The instructions and rating procedures closely followed those used by Brewer (1991). In the training session it was first emphasized that ratings for each work needed to be assigned on an immediate holistic aesthetic impression or response. Secondly, all judges ratings were to be criterion-referenced: The degree to which students were working above or below norm for this group was the principal criterion for assigning a numerical value.

Two training sets of four thematic drawings were selected, representing sample rating levels of 4 (outstanding), 3 (above average), 2 (average), and 1 (below average). Judges were asked to rate each drawing in the first training set and then all judges' ratings were compared. During the training session only, if a two-point difference occurred, those two judges were asked to discuss their rating, and, upon approval, either judge would change his/her score to make a one-point difference. Discussion during the training session was based on the general qualities of idea and execution. This training procedure established criteria and forced each judge to discriminate on independent ratings. The same training procedure was then conducted with the second set of thematic drawings.

The judges then proceeded to rate some 100 thematic drawings that were randomly ordered into four groups (A, B, C, D) of approximately twenty-five. The order of drawings in each group remained the same but the judges' group selections were random. The judging process for the thematic drawings took approximately two hours.

In a second session, the judges were reintroduced to the same training procedure for the observational drawings as used previously for the thematic drawings. The rating process for approximately the same number of drawings took two hours. After the final rating session, the experimental conditions yielding the drawings were disclosed to the judges.

Interjudge Reliability

A Pearson Product-Moment Correlation Coefficient was used to compare the pairs of judges' ratings to describe the degree of association and measure a tendency toward agreement of discrimination for the GHA evaluation procedure. All comparisons for both drawing tasks were positively correlated and significant at the .01 level (see Table 1). From this analysis, the experimenter concluded that all judgments on both drawing tasks were based on consistent criteria.

Results

The data collected from the dependent variables of thematic and observational drawings were used to determine the relationship of independent variables of grade differences, gender differences, and the effect of previous experience with art. The analysis was carried out via SPSS (Statistical Package for the Social Sciences) developed by Nie, Bent, and Hull (1984).

In this study the statistical analysis was performed by a three-factor ANOVA. Each drawing variable (thematic and observational) was examined by two levels for the grade factors (third and seventh), two levels for the gender factors (F and M), four levels for the experience with art factors (at home, at school, both, or none), and by 2-way and 3-way interaction.

Table 1. Pearson Correlation Coefficients for Interjudge Reliability of Four Judges for All Observational Drawings (n = 80)

	J1	J2	J3
J2	.716** .000		
J3	.742** .000	.663** .000	
J4	.632** .000	.569** .000	.671** .000

** < .01

Drawing Analyses

All group mean scores per grade for both drawing tasks were obtained by first summing the four judges' scores for each student, then totaling all individual scores and dividing by the total number of students. The mean score on the drawings from observation was 10.65 for the seventh grade and 6.74 for the third grade, and the overall main effect F-ratio probabilities were by grade $F(1, 64) = 49.70$, $p < .01$, by gender $F(1, 64) = .23$, $p > .05$, and by experience $F(1, 64), = 1.16$, $p > .05$. On the thematic drawing, the mean for the seventh grade was 10.11 and for the third grade was 8.47. Although means were closer for the thematic drawing, the analysis of the main effect F-ratio probabilities (Table 2) were by grade $F(1, 65) = 11.61$, $p < .01$, by gender $F(1, 65) = .05$, $p > .05$, and by experience $F(1, 65) = 2.81$, $p < .05$. The overall main effect finding shows that on the thematic drawing task and to a greater degree on the observational task, the seventh-grade students scored significantly higher than the third-grade students.

Table 2 also indicates that there were no significant 2-way or 3-way interactions for the thematic drawing, and this was a similar finding for the observational drawing. According to Hopkins, Glass, and Hopkins (1987), the absence of interaction provides empirical support that the pattern of results on factor A is constant across all levels of factor B, and that the results for factor A are generalizable over all categories of factor B. So with significant main effect differences for grade on both the untutored thematic and observational drawings and with no significant 2-way interactions, grade can be considered to have a constant and generalized effect on the gender and previous experience variable. The non-significant 3-way interaction suggests that the main effect significance of group and experience was contingent upon and influenced-by-gender.

Table 2. ANOVA by Grade, Gender, and Experience for Thematic Drawing

Source	SS	DF	MS	F	p
Main Effects	96.42	5	19.28	3.85	.004*
GRADE	58.13	1	58.13	11.61	.001*
GENDER	.26	1	.26	.05	.821
EXPER	42.19	3	14.07	2.81	.046*
2-Way Interact	22.40	7	3.20	.64	.722
GRD GEN	.00	1	.00	.00	.998
GRD EXP	7.09	3	2.36	.47	.703
GEN EXP	15.45	3	5.15	1.03	.386
3-Way Interact	28.59	3	9.53	1.90	.138
GRD GEN EXP	28.59	3	9.53	1.90	.138
Explained	147.40	15	9.83	1.96	.032
Residual	325.44	65	5.01		
Total	472.84	80	5.91		

* $p < .05$

Thematic Drawing Analyses

The fact that the three-factor ANOVA found no significant main effect gender differences or any significant 2-way interactions on the thematic drawing is nevertheless a significant finding for this study. Some interesting descriptive information was found in the cell means for like-gender scores between grades levels: Seventh-grade females scored (M = 9.82) and third-grade females (M = 8.62) while seventh-grade males scored (M = 10.37) and third-grade males (M = 8.33). The smaller difference in the female means appears to support the non-significant gender and grade ANOVA findings, but the larger difference in male means points out an interesting between-grade like-gender variation.

A cross-gender descriptive mean comparison within groups shows that third-grade females scored higher (M = 8.62) than the third-grade males (M = 8.33), but in seventh grade, females' scores were lower (M = 9.82) than males' (M = 10.37). So, on the thematic drawing, female scores were higher in third grade and lower in the seventh. A descriptive mean comparison for the observational drawing did not indicate like-gender between-grade or cross-gender within-grade tendencies like those found on the thematic drawing.

The variable of previous experience with art was broken down into four categories: Art at home, art in class, both, or none. Non-weighted numerical values (1, 2, 3, 4) were arbitrarily assigned to each category which allowed the variable to be entered as data and analyzed. On the thematic drawing, the analysis of probability for the overall main effect F-ratio (Table 2) was by grade $F(1, 65) = 11.61$, $p < .01$, by gender $F(1, 65) = .05$, $p > .05$, and by experience $F(1, 65) = 2.81$, $p < .05$. This finding indicates that previous experience as a single factor has a significant impact on all students' thematic drawing scores. There was no 2-way or 3-way interaction, but, like the grade factor, experience has a constant and generalized effect across all levels of grade and gender. The absence of significant 3-way interaction suggests that the significant main effect factors of grade and experience were influenced by gender. There was no overall main effect, 2-way, or 3-way interaction with previous experience on the observational drawings.

Conclusions

What do these findings tell us about the lack of formal art instruction for students in elementary education? First, grade level had an overall main effect influence that is constant and generalized over gender and experience. Even though neither the third-grade nor the seventh-grade students received formal art instruction, the older students made drawings that were reliability-rated as being of higher aesthetic quality. Particularly on the observational drawing, older students excelled. We needed to explain to some third-graders that an observational drawing meant to look, to see, and to try to draw what they saw. For some of the younger students, this was the first-ever attempt at making such a drawing. One female student looked at the objects arranged on the table for about thirty seconds and then returned her total attention to the paper and did not look up again.

Secondly, gender was not found to be a significant factor on either the untutored thematic or observational drawing task. This is, however, an important finding because it contradicts the gender effect reported earlier by Neperud (1966) and Uhlin (1962) but supports the more recent non-gender effect reported by Brewer and Colbert (1992). In an effort to better understand why gender was not a factor, two descriptive observations on the thematic drawings showed that (1) a smaller like-gender mean variation occurred between seventh- and third-grade females than occurred between males, and (2) a negative cross-gender within-grade mean shift occurred when third-grade females scored higher than their male classmates, but then the seventh-grade females scored lower than the seventh-grade males. These descriptive trends indicate the importance of examining the broader issues of why such trends and tendencies occur rather than simply dismissing non-significant factors as generally inappropriate for further discussion. For the educational benefit of all students it is important to further study the gender-related dynamics that might be going on in our schools.

And third, previous experience with art, like grade, was a significant main effect factor. Because of the constant and general influence previous experience has on grade and gender, it is recommended that further study be undertaken to examine its impact on students' untutored drawings. This could be accomplished by comparing groups of students who recieve formal art instruction with those who do not. Within this comparison, the effect of previous art experience at home and the effect of no art experience at all could be re-examined.

Finally, of the 81 students in this study, 25 reported they did art work at home (primarily drawing). Nineteen of the students were third-graders, while only six were seventh-graders. Perhaps Gardner (1982) is correct when he suggests how important it is for students to receive formal art instruction by the time they reach adolescence. He advises that without instruction, they may become frustrated and totally cease their artistic activities. This hint of frustration may be heard in one seventh-grade boy's response to the question, "Do you make art at home?" He replied, "No, but I try."

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A Longitudinal Perspective of an Ethnography: The Life-World of a Beginning Teacher of Art Revisited

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Abstract

Fourteen years after an ethnographic study of a beginning teacher of art was completed, the researcher and the beginning teacher who was the focus of the study met to reflect on the exploration that sought to depict his early career experiences.

Bruce Sawchuk, the neophyte who had been the main informant in that study had successfully purused his career with the same Albertan school authority but in that time had never read the dissertation which had followed the first months of his entry into teaching. Bruce read the study for the first time this year and then shared one more interview. Although many aspects of the study were revisited, it was the ability of the ethnography to depict that complex life-world and the impact of the researcher in the ecology of that experience which are discussed in this article. The ethnographic study was far more trenchant than Bruce had ever anticipated it might be, but he also felt that some of the simultaneous conflict which had been part of the complexity of beginning to teach art had been lost. Similarly, researcher presence may have caused some previously unrecognised effect on the 'isolation' of this artist/teacher.

> *If only I could explain to you how I have changed since those days! Changed yet still the same, but now I can view my old preoccupations with a calm eye. In the thirty years which have passed, the preoccupation has changed its form, become inverted so to speak. When it began, it grew in me and emptied me out, I ignored it at first, then admitted to myself, then sought consolation from friends, then resigned myself to it for my own wisdom. (Sontag, 1982)*

The period of transition from student teacher to experienced teacher is one in which many important changes regarding relationships with others, status, activities, and procedures take place. The first year of teaching is a traumatic and painful period for many teachers and one of which pre-service teacher education institutions and education authorities are very aware of. The time during which a beginning teacher is initiated into teaching is marked by important changes in relationships to others, status, and activities.

Beginning teachers of art face additional problems peculiar to their subject area caused by conceptions held by those around them regarding the value of art and its relationship to education. Conceptions fellow teachers and administrators bring from their own school experience, and those which students develop from their preceding teacher of art. Manifestations of the low esteem in which art may be held by administrators can appear in the forms of inadequate facilities, supplies, and budgeting. Large classes from which the more able students have been streamed out and uncompromising timetable scheduling create problems which can make the position of a beginning teacher untenable.

One of the most important issues, unfortunately neglected in pre-service teacher education is the inadequate attention given to the structural features of the school and the socializing pressure of those who assume roles within it (Eisner, 1972). The contradiction which often exists between what is taught at the university and what exists in schools is particularly dissonant for the teacher.

> All too often, however, the school in which the young teacher teaches is in all important ways a replica of the schools he attended as a child. The institution in which the teacher works might not support the use of skills or view of teaching

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> that was nurtured in the university. Thus it might be extremely difficult for the young teacher to perform a role that he has been led to believe is an appropriate one for a teacher. (Eisner, 1972:14)

Although many transitional problems appear common to many neophyte teachers, the situation into which a beginning teacher of art is placed has unique features which became the focus of the problem investigated in an ethnographic study which coincided with the beginning of the school year in 1979 (Hawke, 1980). One beginning art teacher was selected as the focus of the research and the process of this enculturation into teaching was closely followed from the time he was offered a contract to teach at the conclusion of his university program, to the end of his first semester of teaching. Bruce Sawchuk, the beginning teacher who was the focus of the study, has now been teaching continuously with the same school authority for fourteen years and for the first time since that study was completed he and I were able to meet to reflect on the study that sought to depict that transitory experience. This opportunity to look at the research of that transition into art teaching through the person who had been the principal informant of the study was undertaken immediately after he had read the complete ethnography for the first time.

As the situations which envelop beginning teachers are deeply embedded in the social fabric of the school, which in turn are revealed in interactions with conceptions brought to the situation by the beginning teachers, ethnographic research methods were seen as the most appropriate means to reveal the problems of art teacher induction. See MacGregor and Howke (1982), Stokrocki (1991). Although the school in which Bruce began his career was the principal setting for the study, his thoughts collected during the period that led up to the first day of teaching were also used to identify conceptions held by him before these became entrammelled with those of his then rapidly evolving context(s).

After the study was completed in the summer of 1980 I departed Canada and did not communicate with Bruce, nor become more than casually involved in Albertan schooling issues during the intervening years. This summer, fourteen years later, the opportunity existed to look back on the research of that transition into art teaching through the person who had been the subject of the study. To be able to revisit this life-world with him, after he had read the complete ethnographic study for the first time, offered yet another and irresistible perspective of those experiences, and more significantly, the study.

Bruce and I met briefly on his way to work early in the week to discuss the details of yet one more interview. Although he was enthusiastic to meet and reflect on the study of that intensive period of his entry into teaching he was initially concerned by the unexpected size of the dissertation document he had agreed to read before we were to meet again the following Saturday. Bruce later acknowledged that he was looking forward to reading and discussing what had been written about the start to his now well-established career in teaching and that there would be no problem with me tape-recording our meeting.

Although the retrospective interview included many shared interests this article focuses only on those aspects of the conversation which related to the research process. The issues which emerged from Bruce which related to the ethnographic study were:

1. The unexpected ability of an ethnography to present penetrating description;
2. The lack of representation of important simultaneous conflict;
3. The impact of an "unobtrusive" researcher on the "isolation" of a beginning teacher of art.

The Unexpected Ability of an Ethnography to Present Penetrating Description

Bruce had never perceived the research process to be as extensive and probing as it had been ultimately revealed to him. From the tenor of this interview and the fact that Bruce had never sought to find out what had been written about him indicated that at no time had he considered the study to be significantly revealing. Previously Bruce had only ever read whole transcripts of conversations as a verification of recording and not seen the more closely focused categories of description which made up the final study. Much of his perception of the significance of the study may have been established at the very point of "entering the field." As it was important in the process of the study for the researcher to assume a non-threatening relationship within the culture of the school, the expectations of outcomes may have been forged at that time. In the early stages of data collection Bruce had explained to his classes that the "fellow at the back of the room" was not threatening.

> The second, more generally noticeable phenomenon that could be considered an aspect of entering the field was my introduction to, and subsequent relationship with students of classes I was observing. I had asked Bruce to introduce me as simply as possible to each of the classes I was observing. Bruce's introduction usually followed the lines of "This fellow at the back of the room is Mr. Hawke. Mr. Hawke will be with us from time to time. He is from the university and he will be observing some of our classes. Just forget that he is there."
>
> Surprisingly enough, most students did ignore my presence and many certainly recognized me as no threat as they freely did things in front of me which they took care to make sure Bruce could not see. Those students who did inquire into my role mostly assumed that I was a student with "less than teacher status" and consequently, represented no threat to them. (p. 48)

It seems that in convincing his students of my non-threatening role Bruce may have also believed that my assumed 'less-than-teacher-status' was appropriate for him also and that any data collected by me was concomitantly superficial. This had been indicated by the fact that Bruce was surprised at the insights which were revealed when he read the document. It was the depth to which the study had been able to describe his situation(s) and his thoughts which had surprized him. Reading the study for the first time had caused him to unexpectedly relive some of those "difficult" times.

Q: *Bruce, what were your impressions of the study after you read it for the first time?*

Bruce: *What I thought? It sure brought back ancient memories. My initial response was that you had somehow gotten deep into my consciousness! Very deep into my consciousness. I thought it was very raw and guttural. I don't think anyone has ever got that deep before. The words were raw!*

Q: *My words were raw?*

Bruce: *No mine! That was my initial response when I read it. It was very difficult for me to read. Very difficult to say the least.*

It's like thinking back to the dark ages. I don't know how I survived! (laughter). My initial feeling was that you had captured part of something that each and everyone of us had deep down inside and doesn't get a chance to verbalize. I verbalized parts of it but I don't think we got it all. You never will get it all. I thought perhaps just the nuances were missing, but maybe that's all that was missing.

The Lack of Representation of Simultaneous Conflict

The description which had caused Bruce to feel that it had "captured part of something that each and everyone of us has deep down inside" had also been recognized by MacGregor (1982) as being an essential ingredient of ethnographic research. MacGregor had stated that:

> I have on my desk two recently completed ethnographies, each undertaken by a personable, motivated individual. One work is filled with the smell of chalk and dry tempera paint and staff-room coffee, with the gossip and petty irritations and sense of human struggle that make up life in the school. The other is flat, two-dimensional. The reader has the sense that as the last page is turned, the characters simply cease to be. (1982:3)

Although Stokrocki (1984) challenged MacGregor's position and declared that "not all research is dramatic in the conflictive sense," it was the seeming lack of "conflict" which Bruce identified as missing from the depictions of his past experiences. The function of lessening simultaneous conflict(s) through processing data into linear and discrete ethnographic categories of description seemingly caused Bruce to feel that the layered complexity of his concerns as a beginning teacher of art were not truly represented.

The accuracy of interview transcriptions had previously accounted for some changes in conceptions of what had transpired. During the interviewing process during the original study, in accordance with what had been recommended in the literature, the transcripts of interviews were offered back to informants to verify if they had been accurate records of conversations. Because of the rapidity of unfolding events in his world as a beginning teacher, on several occasions Bruce had already moved his position on things that he had said in interviews and subsequently questioned the transcription. The verification of transcripts against the original tape recordings usually discovered that they were evolving conceptions rather than errors.

Q: *Do you think it was an accurate reflection? That is, apart from being "guttural" and "raw."*

Bruce: *I think all the individual parts of it were extremely accurate. What you have got I think was part of the consciousness but not all of it. You've got the bits and pieces. I don't know if I agree with everything I said in that book. Parts of it I did, but I had other thoughts at the same time that were more than one conflicting thing going on in my brain at the same time. What come to me was that you would get one part of it, but there were other parts that should have been happening. What they were don't ask me now. That's my initial reaction to reading your paper.*

Q: *Do you think it was simplistic?*

Bruce: *No, I don't think it was simplistic. I just don't know if I would call it totally accurate. Some of my statements, the way they turned out. Your observations were very good. Your observations of what was going on were excellent!*

The conduct of ethnographic research has evolved substantially since this study was undertaken. Clifford and Marcus (1986) has addressed the notion of the increasing importance in the use of literary description which was reflected by Bruce in his discussion of the ethnography. Althougn Bruce had felt that on one hand the descriptions of situations and events were "excellent," on the other, the presentation of what he had said in interviews did not seem "totally accurate." Perhaps if the process of restructuring conversations into categories of description had followed less mechanistic structures in attempting to search for clear conceptions and been more "artfully composed" to include the rich description of embedded contexts from which the statements were drawn, then Bruce may have perceived them also as being "excellent."

> It has long been asserted that scientific anthropology is also an "art," that ethnographies have literary qualities. We often hear that an author writes with style, that certain descriptions are vivid or convincing (should not every accurate description be convincing?). A work is deemed evocative or artfully composed in addition to being factual; expressive, rhetorical functions are conceived as decorative or merely as ways to present an objective analysis or description more effectively. (Clifford & Marcus, 1986:4)

In spite of the apparent absence of the simultaneous conflict of all that he had to think about to succeed as a beginning teacher, Bruce still considered the burden of all important issues for him had been included in the study.

Q: *You realize that studies such as this required that the information be structured into meaningful categories to enable understanding?*

Bruce: *I think this study is good for beginning teachers. It's good for them to really get the 'blood and guts' of day-to-day happenings, that overwhelming feeling of being burdened with so many different kinds of things other than teaching that have been described.*

The Impact of an "Unobtrusive" Researcher on the "Isolation" of a Beginning Teacher of Art

Although Bruce and I had met on occasions to talk about his expectations and anticipations before he actually began teaching in the summer of 1979, it was the important process of "entering the field" which on reflection had been a more significant determinant in the outcomes of the study than had been previously anticipated. The process which had been undertaken to assume a position of unobtrusiveness in the school cultures had not been considered at the time as being so potentially influential. As mentioned earlier the students had been successfully encouraged to assume that the "person at the back of the room" was not threatening in terms of understanding all of what was happening but it seems so had the principal informant.

The study had been underpinned by the notion which Wolcott (1975) had promoted that the researcher is the "main instrument" in ethnographic research which charges him, or her, with the obligation of deciding in which direction the research should be pursued. Such dynamic involvement in the process of data collection had also been defined by Malinowski (1922) as essential so that the researcher is able "to change his views constantly" in pursuit of the culture being investigated. Similarly, Eisner's (1979) notion of "connoisseurship" and Wilson's (1977) concept of "synthesis" also established the researcher as being a dominant and identifiable part of ethnographic research. When considered pertinent, the reactions to, and descriptions of phenomena by the researcher was able to be presented in the first person, so that a clearer distinction was able to be made from informant attitudes.

The process of fulfilling the ethnographic researcher role in this study, to be as unobtrusive as possible, had been regarded as having been completely successful. Now, fourteen years later according to Bruce, the process of intruding into the culture of a beginning teacher appeared in retrospect to have caused some researcher effect.

Because beginning art teachers are generally isolated from their subject-colleagues, the issues related to support for a beginning art teacher emerged as an anticipated focus of discussion in the study. In the first months of teaching Bruce had received no assistance in the teaching of

Art from anyone in the school nor school system. Not only was he denied assistance he did not seek advice, as he felt that these were problems which no one else could solve for him. The following parts of interviews took place after only a few weeks of beginning to teach.

Q: *How do you feel about the amount of assistance you have been given, to this point, as a beginning teacher?*

Bruce: *I haven't been offered any as far as teaching goes. (19.9.79)*

Q: *Has anyone approached you from the front office, specifically in relation to helping you because you're a beginning teacher, or asked you if there is anything they could help you with?*

Bruce: *I don't know if there is anything they could help me with. But nobody's offered to help anyway. But I'm the kind of person that if I had a problem, I always bring it up. I don't wait to be asked. So maybe that's one of the reasons they don't ask me. Plus, I think Jim Kuch (principal) sees a lot of good work coming out of this room and feels "Why does he need help?" But if I did need help I'd go up. But it's the kind of help I can't get from anybody.*

Q: *Anybody in the school?*

Bruce: *Yes, I couldn't get this help from anybody, it's the sort of help I have to work out for myself. Like, how do I introduce color? Like I tried a few different ways one day, and I was thinking about it the whole weekend. "How was I going to do it?" But when I finally started I didn't want them to do a silly color wheel, I thought that was silly, but after I started talking I realized that I had to have something.*

Q: *That was the day I observed two or three different lessons where you introduced color in different ways?*

Bruce: *That's right. They're the sort of problems no one can help you with. (12.10.79)*

The problems of support for a beginning teacher were rekindled for Bruce when he was required to teach another subject after teaching only art for five years. The relationship of working with others in the same subject area offered both direction and a realization that in art he was very independent as the sole teacher of a subject in a school.

Bruce: *I almost felt like a beginning teacher when I taught English. Five years later after I taught Art solidly for five years, I taught English. No other subject, just Art. All of a sudden I was thrown an English course and, you know, I felt like a beginning teacher, my mind was blank. What do I do? What do I do in first year English teaching? What is a noun? What is a verb? This is how I was taught English. It was so much easier because I had four or five colleagues giving me things. "Here, do this today Bruce." "We're going to be doing this in my class today. Take this, use this information, this handout, just review this material and have them write this essay afterwards." It's so much easier. I had colleagues. If I had a problem I would just go next door and there would be another person teaching English. "Jesus, I don't know. Which area should I cover?" "I do this, this and this. Here's my cabinet go through it." Well when I came into Art, you know you were there. I had nothing absolutely nothing. I couldn't turn to anyone. (9.5.93)*

At this most recent meeting Bruce suggested that he now felt that my role as researcher was more supportive than it had previously been recognized to be.

Q: *I was no help?*

Bruce: *You were a help in a way. I had an advantage there that nobody else (other beginning art teachers) had, which I will get back to. Who did I have to turn to? Other than the Phys Ed teacher who used to teach art, who never really knew what she was doing. She did some crafty things and she did not have an art background. So I had nobody to turn to. As you stated in the report I did not seek anybody out, but who was there to seek out? I knew Alan Ware (Supervisor of Art in the School Board) downtown. He was help in a way. Nobody who was there can give me the blood and guts of what first year teaching was about. What should I do to build a program?*

Q: *Earlier I said that I was no help to you, and you said you would come back to it.*

Bruce: *Now that I think about it after I have read your study, I had an outlet. It was like having a coach to talk to. But it was there. It was real. I was able to, although you were not able to influence or suggest things, I could sort of bounce things off you. Almost like when we see things and they reflect back at us, and we say, "Oh, that's me!" I was able to bounce things back off you and heard what I was saying. I think that helped. (9.5.93)*

Bruce thought having someone around "to bounce things back off" may have made his situation as a beginning teacher different from "normal." Although every possible precaution was made at the time the study was made to ensure that the research process was unobtrusive as possible these later considerations have allowed Bruce to perceive it differently.

In research which involves any level of intervention the opportunity must exist for some degree of researcher-effect on the outcomes. To what level this may have occurred in this study can only be speculated but what is now significant is that the subject of the research said "I think that helped." If the research had never taken place Bruce's initiation into teaching may have been more uncomfortable and perhaps more "authentic." Conversely, the discussions may have simply been transferred to some other receptive person with the same reflective practice effect.

Bruce had considered that although he was isolated as a teacher, and irrespective of his, perceived notion of the researcher-effect of verbalizing his thoughts to someone else, his "isolation" was also advantageous. Bruce believed that not having restrictions of others around him allowed him to develop his own ideas. Although Bruce now considered me as a sounding board in those early days, he still believed that essentially he had no one to turn to for help. Not only did he feel that there was no one he could turn to, he may have never wanted to share his world as a beginning teacher with someone else. Bruce described his vision of teaching art and ultimately how it related to other people.

Q: *This paper will only be about us reflecting on some of the issues of what happened fifteen years ago.*

Bruce: *I wouldn't want anybody to go through what I went through. I don't know how I would go back to that sort of thing. I don't know. I must have been very strong internally to survive what was thrown at me. Maybe it was because of the idealism I have. Thinking back to that part (pointing to the study) "We're going to do art today!" "We are going to do drawing today!" That was enough planning! It was enough planning as far as I was concerned at the time. Because it was magical. To me it was magical word.*

Q: *Do you think you really wanted anyone to specify what you should* *do in the way the English teachers were able to?*

Bruce: *And compete against my idealism and my understanding of what I wanted to do in Art? I was magical. I could go in there and I could create. I would snap my fingers and all my students would be with me and do exactly what I wanted to do and be creative all of a sudden. Yes, a piece of mould, I could squeeze it this way and push it that way and everything would happen (Bruce laughed at his past confidence and naivety). Wow! what a way to start a year. Is that what happens today? Although I think there is a much better support system now, consultant-wise. We have a couple of good people in there who recognise and have a good understanding of how to get you started, how to help a beginning teacher.*

Q: *In reading that study now, how would you have liked someone to be looking over your shoulder telling you what to do, what should be done? It seems you had a pretty clear idea of the path you were taking.*

Bruce: *That's right. That's what I said "Who would I have turned to?" Who would have dared interfere with my idealistic approach that initially I started with? Who would I have allowed to dare to interfere with what I thought was Art, Art Education and this mysticism which I believed existed in the teaching of art, who would I have allowed?*

Conclusion

This interview has looked at a fourteen year old ethnographic study through the eyes of the principal informant from a perspective which obviously would have been impossible to consider at the time of the original research. The principal informant is obviously no longer a beginning teacher but is still a member of that same school culture which has enabled him to comment from changed but informed sympathetic perspectives.

I imagine that if this study was to be undertaken now, Clifford's and Marcus (1986) notion of embodying greater artistic description within the study may have allowed it to be more "vivid and convincing" and such increased descriptive involvement may reveal the researcher to be more included as a participant than solely identified as an observer. As a consequence it would more overtly incorporate researcher interpretation and influence.

Similarly the "review" and "discovery" stages of "cultural" and "analytical" categories described by McCracken (1988) may offer a more flexible vehicle for this to happen.

The changed perspectives of the focus of the study have produced interesting commentary on the reliability of the ethnography. In no way is it considered that this reflection should be used to change the original research because to interfere with it now would be of no value. Rather, this process is intended to use the changed situations of an "insider" who is now an "outsider" to focus on the credibility of the ethnographic study and aspects of that research which sought to depict his life-world.

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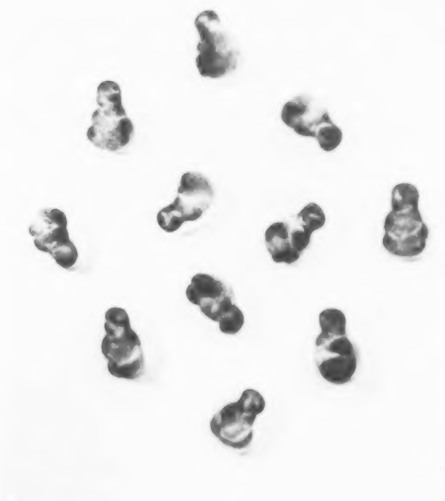

Buzz Spector
"Hospitalite: pour
Georges Bataille"
1988-89
bread and bed pans
(11 pieces) 84" diameter
15" x 10" x 9" each

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